FH-7

AEP Model
UK Model
E Model

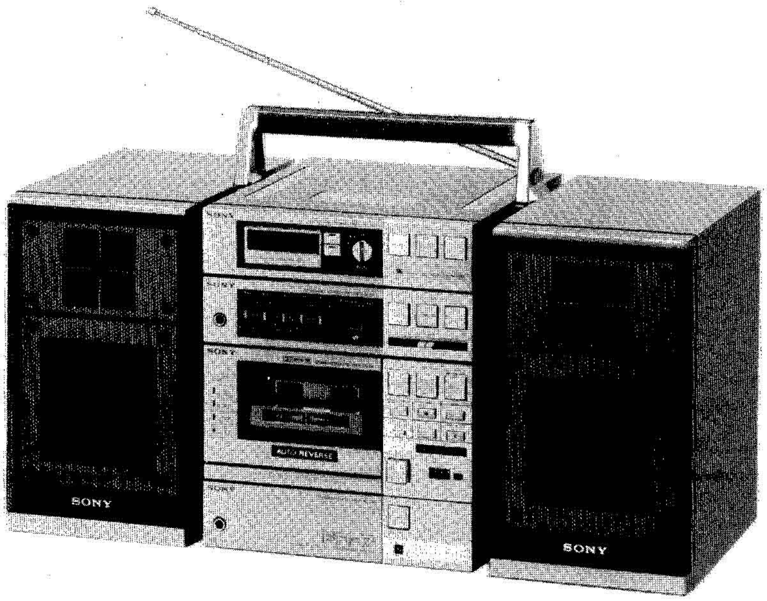

Photo : AEP, UK model

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COMPACT HI-DENSITY COMPONENT SYSTEM

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SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY SHADING AND MARK ⚠ ON THE SCHEMATIC DIAGRAMS, EXPLODED VIEWS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

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SERVICE MANUAL

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Handling Precautions for MOS ICs

Generally, the insulation resistance of the oxide layer in MOS IC structures is very high, and the oxide layer is very thin. Because of this, it is possible that the static voltages usually present on clothes and the human body will be enough to generate a potential difference across the insulator, high enough to cause a breakdown of the insulating layer.

The following precautions should be taken while handling these ICs.

(Particular care should be taken under conditions of low humidity.)

Precautions in Replacing MOS ICs

1. Store new ICs by inserting them into a urethane-polyester cushion (which is somewhat conductive), or wrapping it in aluminum foil, so that all the pins are at the same potential.
   (The ICs should be stored in that manner until mounted on the circuit board.)

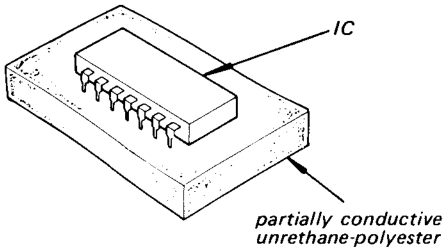

IC
partially conductive unrethane-polyester cushion

Fig. A

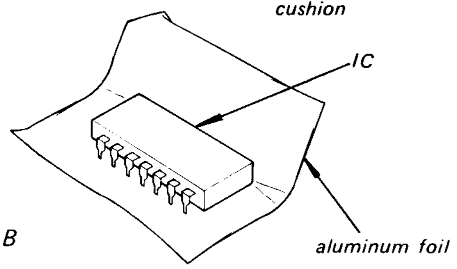

IC
aluminum foil

Fig. B

2. Check the soldering iron for possible power-line leakage current. Make sure that there is no leakage path by connecting an ohmmeter to the tip of the soldering iron and the plug as shown in Fig. C. If there is a leakage path, use some other soldering iron.

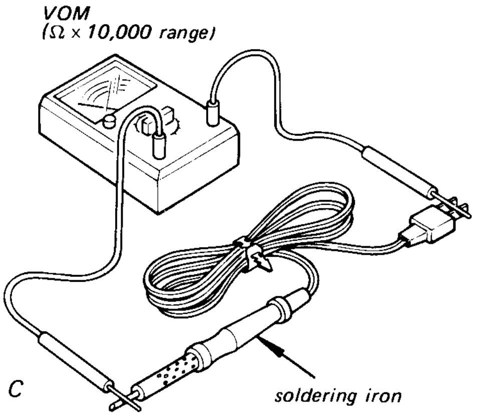

VOM
(Ω x 10,000 range)
soldering iron

Fig. C

3. Equalize any potential difference between the clothes, the tools in use, the work bench, the set being worked on, and the packaged IC by touching them all in succession with the hands or a conductive wire or tool.
4. The following are effective methods for handling ICs that remove the potential difference across the oxide layer.
   - Use a paper clip modified by soldering in a wire braid insert.

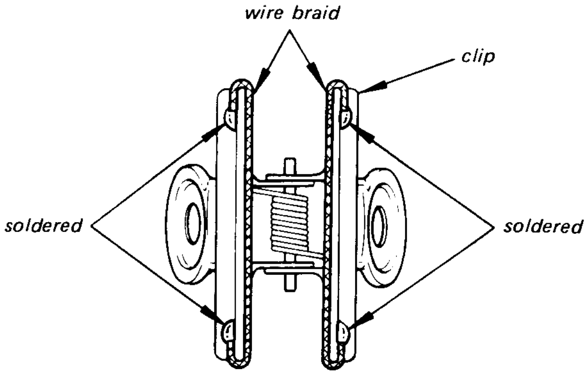

wire braid
clip
soldered
soldered

Fig. D

Make sure that there is no solder on the inside.

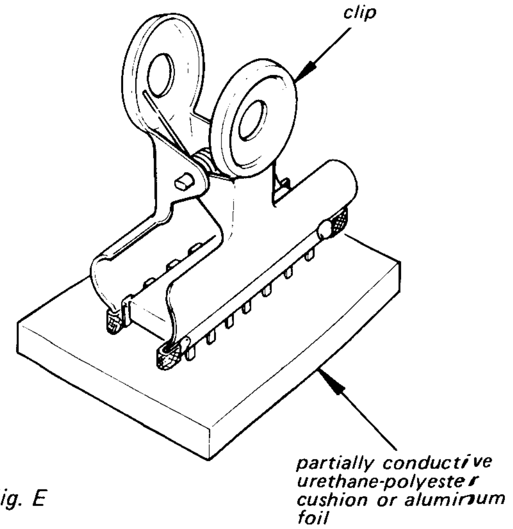
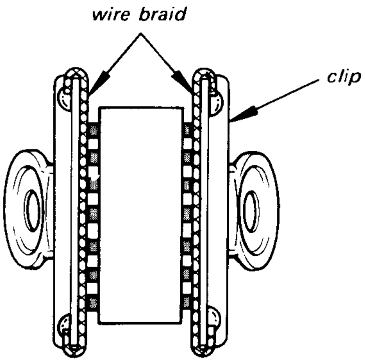

clip
partially conductive urethane-polyester cushion or aluminum foil

Fig. E


wire braid
clip

Make sure that all the pins are in contact with the wire braid (all the pins will then be at the same potential.).

Fig. F

- Take a short length of fine bare wire and wind it around the IC so that it shorts all the pins of the IC, while it is still in the urethane-polyester cushion or aluminum foil. This ensures that all the pins are at the same potential.

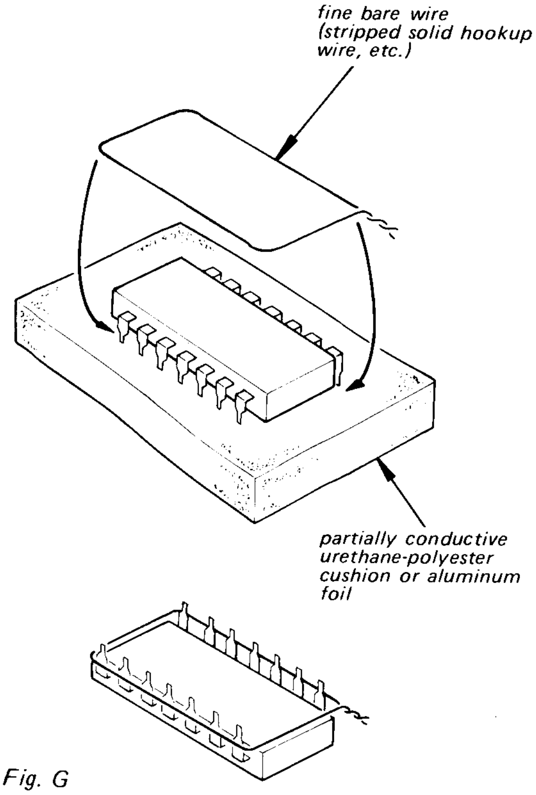

fine bare wire
(stripped solid hookup
wire, etc.)
partially conductive
urethane-polyester
cushion or aluminum
foil

Fig. G

- When it is necessary to handle the IC with the fingers, do not touch any pin, and hold the IC at the ends of its plastic-package case as shown in Fig. H.

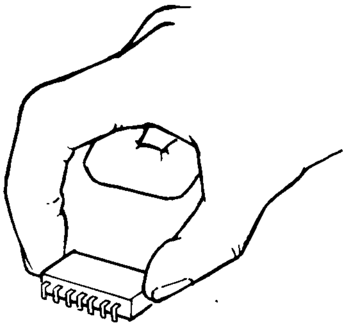


Fig. H

5. Method of Mounting
Insert the IC while holding it with the modified clip, and solder all the pins with the clip still shorting the pins. (Similarly, solder all the pins while the bare shorting wire is still wound around them.). Remove the clip or the bare shorting wire only after all the pins have been soldered.

Precaution while Checking C-MOS ICs

The C-MOS ICs (Complementary MOS) are MOS ICs that have their output sections made up of N-channel and P-channel push-pull stages to increase their speed of operation. If the output terminal of these ICs comes into contact with B+ or B– voltage, then the FET which is ON at that time will either become shorted or open.

This is valid for all the output sections that are connected together by the interconnections. Even the circuits that are physically separated (and not on the same board) can be destroyed simultaneously.

Example:

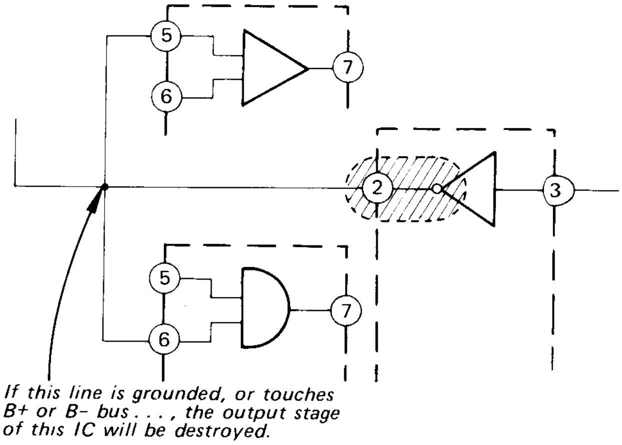

5
6
7
2
3
5
6
7
If this line is grounded, or touches
B+ or B– bus . . . , the output stage
of this IC will be destroyed.

Fig. I

CAUTION ON POWER SUPPLY

There are two ways of power supply in FH-7.
One is by AC-78 using AC power supply, the other is by DC power unit EBP-78 (optional accessory). Each of them has different signal path and B+ bus mutually.

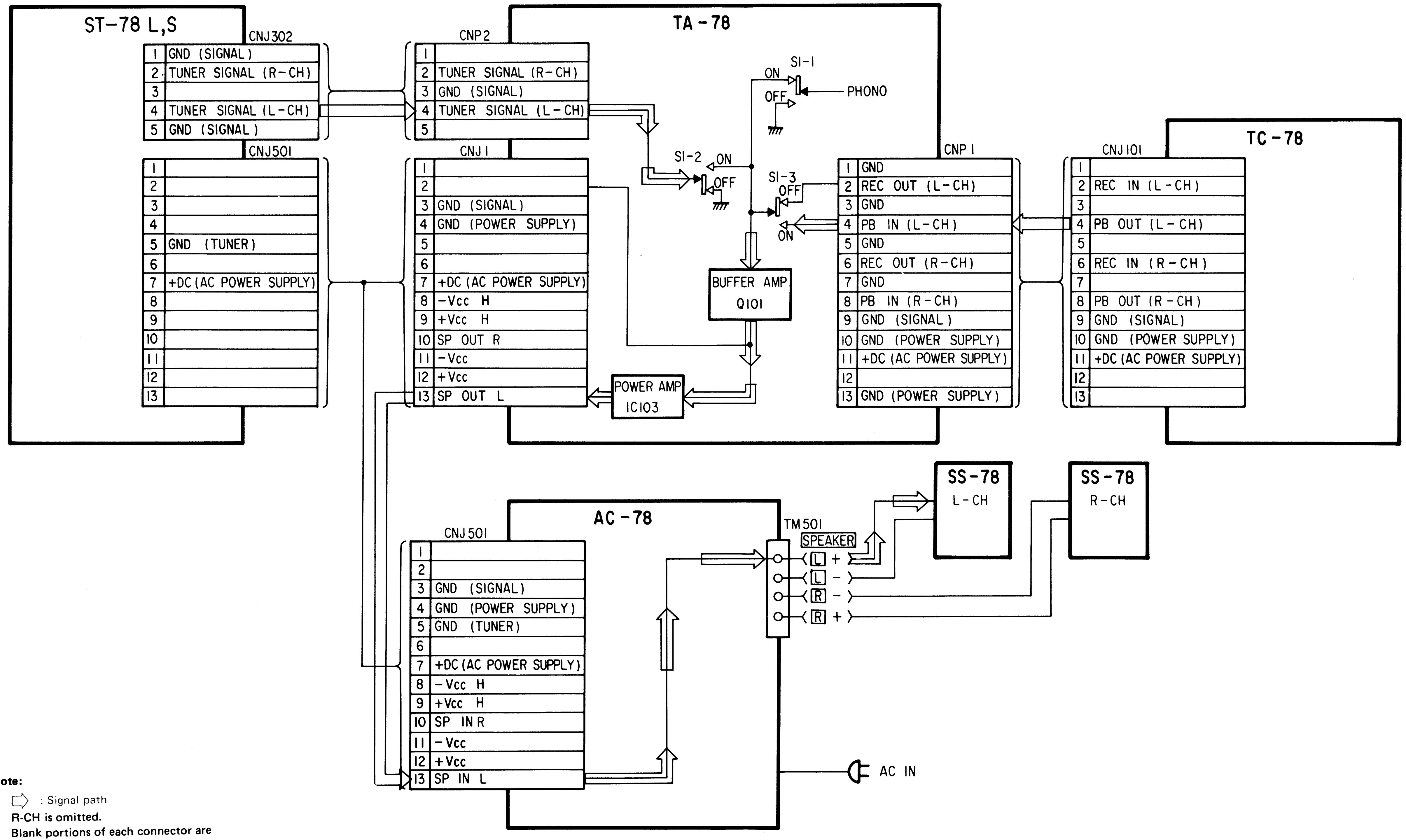
- **THE CASE BY AC-78 USING AC POWER SUPPLY**
  There are five B+ buses from AC-78, +DC (AC power supply), +VccH, −VccH, +Vcc and −Vcc. +DC (AC power supply) is supplied to ST-78 (or ST-78S), TA-78 and TC-78, also +VccH, −VccH, +Vcc and −Vcc are supplied to TA-78 only. These four B+ buses to TA-78 are for IC103 (L-CH) and IC104 (R-CH) as the power amplifier in TA-78. Signals from each set are amplified at IC103, 104 and drive the speakers.

- **THE CASE BY EBP-78 (optional accessory)**
  B+ bus from EBP-78 is only +DC (DC power supply), and this B+ bus is supplied to ST-78L (or ST-78S), TA-78 and TC-78.
  According to one B+ bus by +DC (DC power supply), power is not supplied to IC103, 104 as the power amplifier in TA-78, so there is no amplification at TA-78. Therefore, there is IC101 as a amplifier in EBP-78. Signals are amplified there, and drive the speakers.

  See page 7 − 10 on connection and signal path of the each case by AC-78, EBP-78.

CONNECTION BETWEEN EACH SET AND SIGNAL PATH

The Case of Power Supply by AC-78

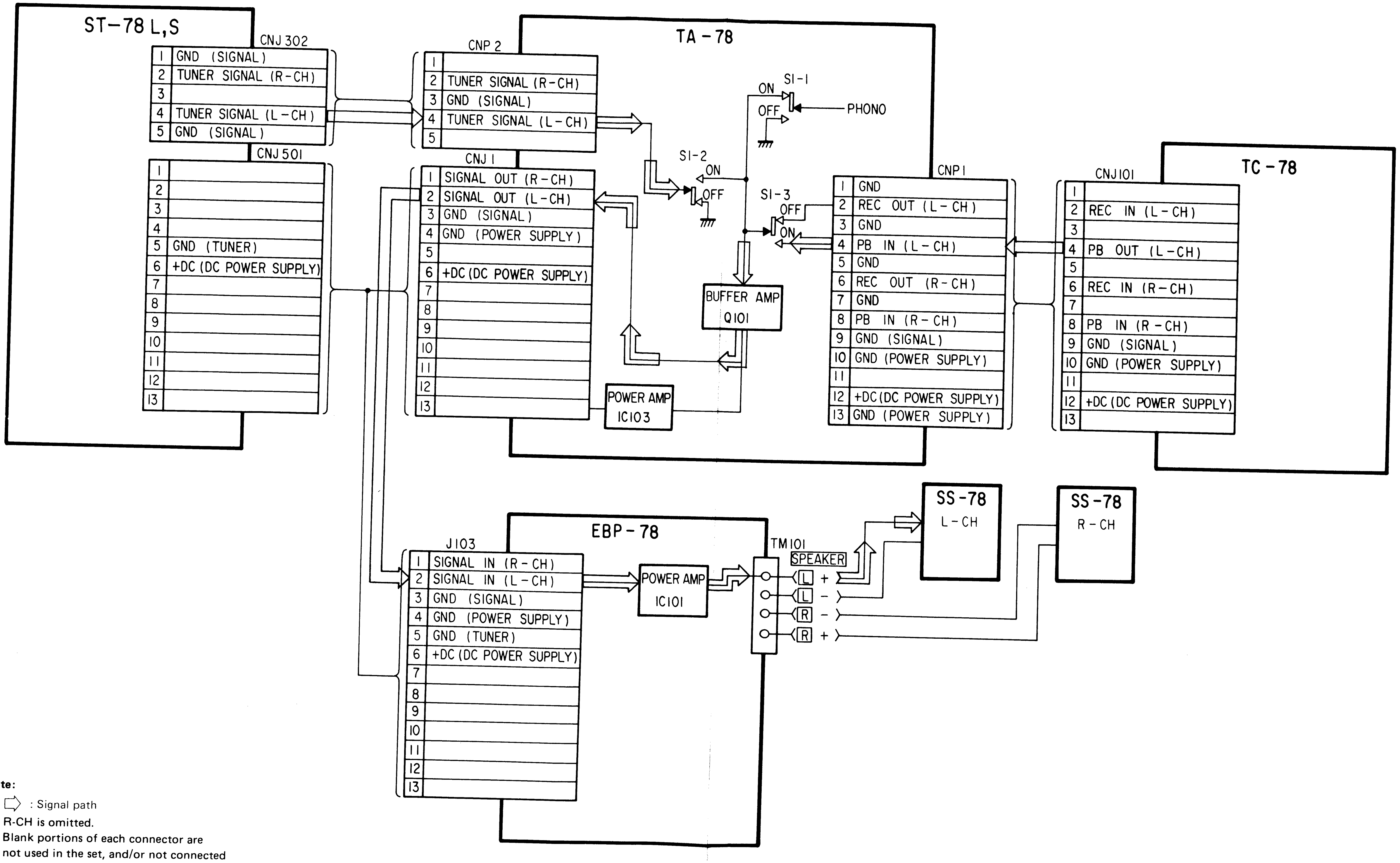

ST-78 L,S
CNJ302
1 GND (SIGNAL)
2 TUNER SIGNAL (R-CH)
3
4 TUNER SIGNAL (L-CH)
5 GND (SIGNAL)
CNJ501
1
2
3
4
5 GND (TUNER)
6
7 +DC (AC POWER SUPPLY)
8
9
10
11
12
13
TA-78
CNP2
1
2 TUNER SIGNAL (R-CH)
3 GND (SIGNAL)
4 TUNER SIGNAL (L-CH)
5
CNJ1
1
2
3 GND (SIGNAL)
4 GND (POWER SUPPLY)
5
6
7 +DC (AC POWER SUPPLY)
8 -Vcc H
9 +Vcc H
10 SP OUT R
11 -Vcc
12 +Vcc
13 SP OUT L
SI-1
ON
OFF
PHONO
SI-2
ON
OFF
SI-3
OFF
ON
BUFFER AMP
Q101
POWER AMP
IC103
CNP1
1 GND
2 REC OUT (L-CH)
3 GND
4 PB IN (L-CH)
5 GND
6 REC OUT (R-CH)
7 GND
8 PB IN (R-CH)
9 GND (SIGNAL)
10 GND (POWER SUPPLY)
11 +DC (AC POWER SUPPLY)
12
13 GND (POWER SUPPLY)
TC-78
CNJ101
1
2 REC IN (L-CH)
3
4 PB OUT (L-CH)
5
6 REC IN (R-CH)
7
8 PB OUT (R-CH)
9 GND (SIGNAL)
10 GND (POWER SUPPLY)
11 +DC (AC POWER SUPPLY)
12
13
SS-78
L-CH
SS-78
R-CH
AC-78
CNJ501
1
2
3 GND (SIGNAL)
4 GND (POWER SUPPLY)
5 GND (TUNER)
6
7 +DC (AC POWER SUPPLY)
8 -Vcc H
9 +Vcc H
10 SP IN R
11 -Vcc
12 +Vcc
13 SP IN L
TM501
SPEAKER
L +
L -
R -
R +
AC IN

Note:

- ⇨ : Signal path
- R-CH is omitted.
- Blank portions of each connector are not used in the set, and/or not connected inside of the set.

CONNECTION BETWEEN EACH SET AND SIGNAL PATH

The Case of Power Supply by EBP-78 (optional accessory)


ST-78 L,S
CNJ 302
1 GND (SIGNAL)
2 TUNER SIGNAL (R-CH)
3
4 TUNER SIGNAL (L-CH)
5 GND (SIGNAL)
CNJ 501
5 GND (TUNER)
6 +DC (DC POWER SUPPLY)
TA-78
CNP 2
1
2 TUNER SIGNAL (R-CH)
3 GND (SIGNAL)
4 TUNER SIGNAL (L-CH)
5
CNJ 1
1 SIGNAL OUT (R-CH)
2 SIGNAL OUT (L-CH)
3 GND (SIGNAL)
4 GND (POWER SUPPLY)
5
6 +DC (DC POWER SUPPLY)
S1-1
ON
OFF
PHONO
S1-2
ON
OFF
S1-3
OFF
ON
BUFFER AMP
Q101
POWER AMP
IC103
CNP1
1 GND
2 REC OUT (L-CH)
3 GND
4 PB IN (L-CH)
5 GND
6 REC OUT (R-CH)
7 GND
8 PB IN (R-CH)
9 GND (SIGNAL)
10 GND (POWER SUPPLY)
11
12 +DC (DC POWER SUPPLY)
13 GND (POWER SUPPLY)
TC-78
CNJ101
1
2 REC IN (L-CH)
3
4 PB OUT (L-CH)
5
6 REC IN (R-CH)
7
8 PB IN (R-CH)
9 GND (SIGNAL)
10 GND (POWER SUPPLY)
11
12 +DC (DC POWER SUPPLY)
13
EBP-78
J103
1 SIGNAL IN (R-CH)
2 SIGNAL IN (L-CH)
3 GND (SIGNAL)
4 GND (POWER SUPPLY)
5 GND (TUNER)
6 +DC (DC POWER SUPPLY)
POWER AMP
IC101
TM101
SPEAKER
L +
L −
R −
R +
SS-78
L-CH
SS-78
R-CH

Note:

- ⇨ : Signal path
- R-CH is omitted.
- Blank portions of each connector are not used in the set, and/or not connected inside of the set.

SPECIFICATIONS

ST-78S/78L

System	FM stereo, FM/AM superheterodyne tuner Quartz- locked digital synthesizer system

General

Dimensions	Approx. 215 × 55 × 240 mm (w/h/d) (8½ × 2⅛ × 9⅜ inches) incl. projecting parts and controls
Weight	Approx. 1.1 kg (2 lbs. 7 oz) net

FM tuner section

Tuning range	87.5-108 MHz
Antenna terminals	75 ohm unbalanced
Intermediate frequency	10.7 MHz
Usable sensitivity	2.3 μV, S/N = 30 dB/75 ohm
Signal-to-noise ratio	78 dB (mono), 70 dB (stereo)
Harmonic distortion	0.2% (mono), 0.5% (stereo) at 1 KHz
Separation	Better than 40 dB at 1 kHz
Selectivity	55 dB (400 kHz)

MW/LW tuner section (for ST-78L) AEP, UK model

		MW	LW
Tuning range		522—1,602 kHz	153—344 kHz
Antenna		Built-in ferrite bar antenna, External antenna terminal	
Intermediate frequency		450 kHz	450 kHz
Usable sensitvity	built-in antenna	250 μV/m (1,000 kHz)	500 μV/m (230 kHz)
	external antenna	100 μV (1,000 kHz)	150 μV (230 kHz)
Signal-to-noise ratio (50 mV/m)		52 dB	52 dB
Harmonic distortion (50 mV/m, 400 Hz)		0.3%	0.3%
Selectivity		30 dB (9 kHz)	40 dB (9 kHz)

SW/MW tuner section (for ST-78S) E model

		SW 1	SW 2	MW
Tuning range		3.2 - 7.3 MHz	9.5 - 21.75 MHz	522 - 1,602 kHz (at 9 kHz step) 530 - 1,610 kHz (at 10 kHz step)
Antenna		External antenna terminal		Built-in ferrite bar antenna, External antenna terminal
Intermediate frequency		450 kHz		450 kHz
Usable sensitivity	built-in antenna	—	—	250 μV/m (1,000 kHz)
	external antenna	23 μV (5 MHz)	30 μV (15 MHz)	100 μV (1,000 kHz)
Signal-to-noise ratio		50 dB (5 mV)		52 dB (50 mV/m)
Harmonic distortion		0.3% (5 mV, 400 Hz)		0.3% (50 mV/m,400 Hz)
Selectivity		30 dB (9 kHz)		30 dB (9 kHz)

TC-78

Recording system	4-track 2-channel stereo
Frequency response	DOLBY NR OFF (DIN) With TYPE IV cassette (Sony METALLIC cassette) 30 - 16,000 Hz (±3 dB) With TYPE III cassette (Sony FeCr cassette) 30 - 16,000 Hz (±3 dB) With TYPE II cassette (Sony CD-α cassette) 30 - 15,000 Hz (±3 dB) With TYPE I cassette (Sony BHF cassette) 30 - 14,000 Hz (±3 dB)
Wow and flutter	0.07% WRMS (NAB) ±0.2% (DIN)

General

Dimensions	Approx. 215 × 103 × 235 mm (w/h/d) (8½ × 4⅛ × 9⅛ inches) incl. projecting parts and controls
Weight	Approx. 3.5 kg (7 lbs 12 oz) net

TA-78

Continuous RMS power output (**AEP, UK model**)	38 + 38 watts (6 ohms, at 1 kHz) 5% 30 + 30 watts (6 ohms, at 1 kHz) 0.5% 24 + 24 watts (6 ohms, 40 Hz - 20 kHz) 0.5%
Music power (**E model**)	120 watts (6 ohms)

Inputs

	Sensitivity	Impedance
PHONO (phono jacks)	2.5 mV	50 kilohms
CD/AUX (phone jack)	150 mV	50 kilohms

Frequency response	PHONO : RIAA curve ± 0.5 dB CD/AUX : 15 Hz - 60 kHz $^{+0}_{-3}$ dB

General

Dimensions	Approx. 215 × 55 × 240 mm (w/h/d) (8½ × 2⅛ × 9½ inches) incl. projecting parts and controls
Weight	Approx. 1.2 kg (2 lbs 11 oz) net

— Continued — ⟶

AC-78

Power requirements	AEP, UK model: Operates on 220 V or 240 V ac E model: Operates on 120, 220 or 240 V ac
Outputs	
HEADPHONES	Accepts headphones of 8 ohms or more
SPEAKER	Accepts speakers of 6 to 16 ohms
General	
Dimensions	Approx. 215 × 55 × 235 mm (w/h/d) ($8^1/_2$ × $2^1/_8$ × $9^3/_{16}$ inches) incl. projecting parts and controls
Weight	Approx. 3.5 kg (7 lbs 12 oz) net

SS-78

Speaker system	2 way speaker system Woofer: 10 cm Tweeter: 5 cm
Power handling capacity	Music 60 watts Nominal 30 watts
Frequency range	80 Hz - 20 kHz
Sensitivity	90 dB/W/m
Impedance	6 ohms
General	
Dimensions	Approx. 160 × 260 × 230 mm (w/h/d) ($6^3/_8$ × $10^1/_4$ × $9^1/_8$ inches)
Weight	Approx. 2.7 kg (6 lbs) net per unit

General

Power consumption	AEP, E model: 65 watts UK model: 220 watts
Dimensions	Approx. 535 × 320 ×240 mm(w/h/d) ($21^1/_8$ × $12^5/_8$ × $9^1/_2$ inches) incl. projecting parts and controls
Weight	Approx. 15.1 kg (33 lbs 5 oz) net Approx. 16.5 kg (36 lbs 7 oz) in shipping carton

Caution on UK model

Important

The wires in the mains lead are coloured in accordance with the following code:

Blue:	Neutral
Brown:	Live

As the colours of the wires in the mains lead of this apparatus may not correspond with the coloured markings identifying the terminals in your plug proceed as follows:

The wire which is coloured blue must be connected to the terminal which is marked with the letter N or coloured black.

The wire which is coloured brown must be connected to the terminal which is marked with the letter L or coloured red.

FEATURES

The Sony FH-7 is a compact high-density component system consisting of an FM stereo/FM-AM tuner, a high quality cassette deck, and integrated amplifier. You can take it anywhere so that you can enjoy a variety of program sources--broadcast programs, taped programs, etc., anytime you like.

The FH-7's matched components are the equal of fine separate components and have the following features:

- Three different power sources: house current using supplied AC power supply unit, batteries and 12 V car battery using the optional DC power supply unit (EBP-78).
- Newly developed flat connecting cords which enable you to connect each component quickly and easily.
- The connectable carrying handle makes the FH-7 carriable as a small suit case.

Amplifier section

- CD/AUX jack for duplicating a tape with an external tape recorder and phono input jacks for listening to records.
- Five frequency band equalizer to compose the source sound to your liking.

Tuner section

- The quartz-locked digital synthesizer system with a sophisticated Phase Locked Loop (PLL) circuit allows extremely precise tuning of FM and MW/LW or SW stations with an electronic digital readout on the frequency display.
- Built-in telescopic antenna and external antenna terminals.
- The PLL (Phase Locked Loop) multiplex circuit assures stable FM reception

Cassette deck section

- The cassette deck can use the metal tapes, providing wider dynamic range and extended frequency response.
- Auto-reverse function for changing the tape direction automatically in the playback mode. You don't have to turn the cassette over to play the other side.
- Automatic Music Sensor (AMS) allows easy playback of the selection being played and easy skipping to the next selection.
- The new automatic recording system sets the recording level automatically.
- The record muting function allows you to eliminate material you do not want to record, such as commercials, and to make a blank space between selections.
- The Dolby NR (noise reduction) system reduces tape hiss and assures high quality recording and playback.

AC power supply section

- Permits headphones to be connected. Their volume is adjustable.
- This section supplies power to the tuner, amplifier and tape deck.

MODEL IDENTIFICATIONS

(TA-78 & SS-78 have no differences by the model.)

- This label is sticked on TC-78.

SONY® MODEL NO. FH-7

COMPACT HI-DENSITY COMPONENT SYSTEM

ST-78L ... AEP, UK Model
ST-78S ... E Model

: FM STEREO/FM-AM TUNER
TA-78 : INTEGRATED STEREO AMPLIFIER
TC-78 : STEREO CASSETTE DECK
AC-78 : POWER SUPPLY UNIT
SS-78 : SPEAKER SYSTEM

SERIAL NO.
MADE IN JAPAN

ST-78L

SONY® MODEL NO. ST-78L

FM STEREO/FM-AM TUNER
COMPACT HI-DENSITY COMPONENT SYSTEM FH-7

FREQUENCY RANGE: FM: 87.5 – 108MHz
MW: 522 – 1602kHz LW: 153 – 344kHz
IF FM; 10.7MHz AM; 450kHz

BLANK ... AEP, UK Model
FTZ-PRÜFNUMMER U185 ... For WEST GERMANY

SERIAL NO.
MADE IN JAPAN

AC-78

SONY® MODEL NO. AC-78

POWER SUPPLY UNIT
COMPACT HI-DENSITY COMPONENT SYSTEM FH-7

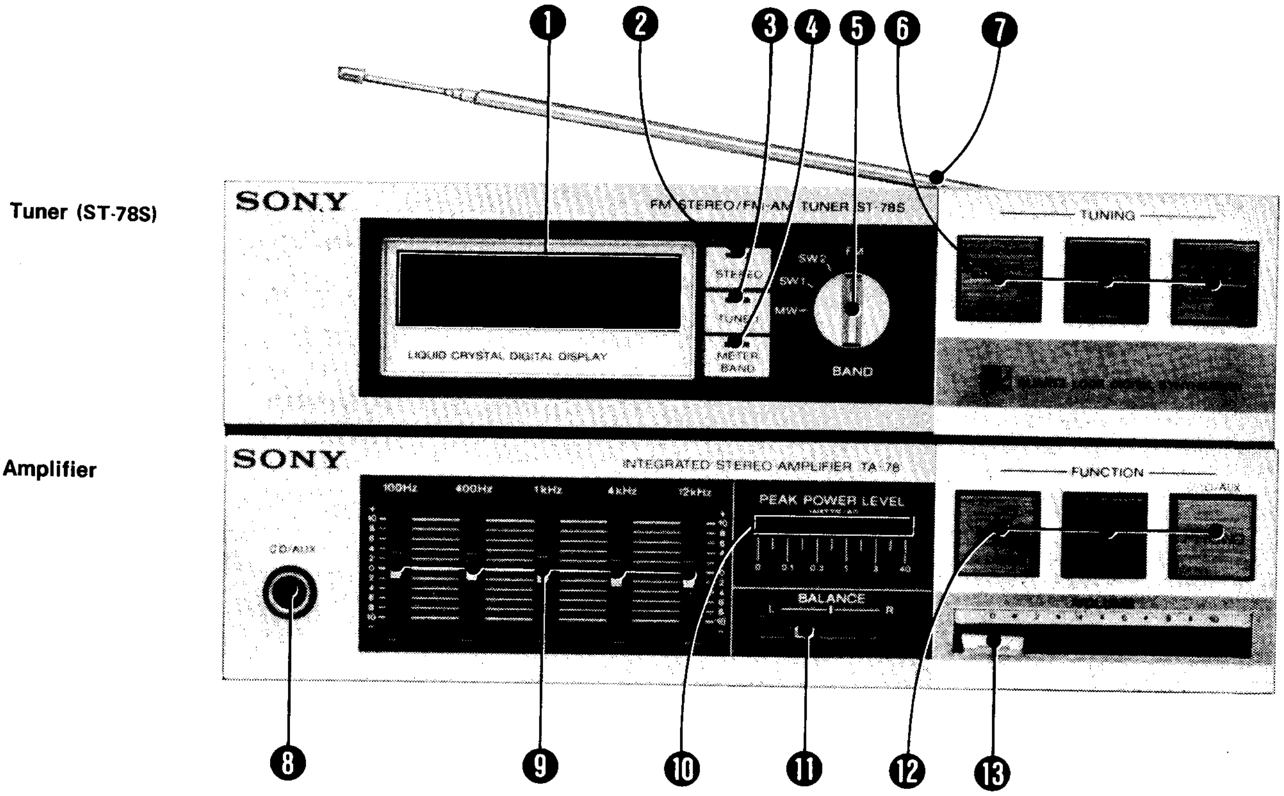
AC . 220/240V ~ 50/60Hz 65W ... AEP Model
AC . 220/240V ~ 50/60Hz 220W ... UK Model
AC : 120/220/240V ~ 50/60Hz 65W ... E Model

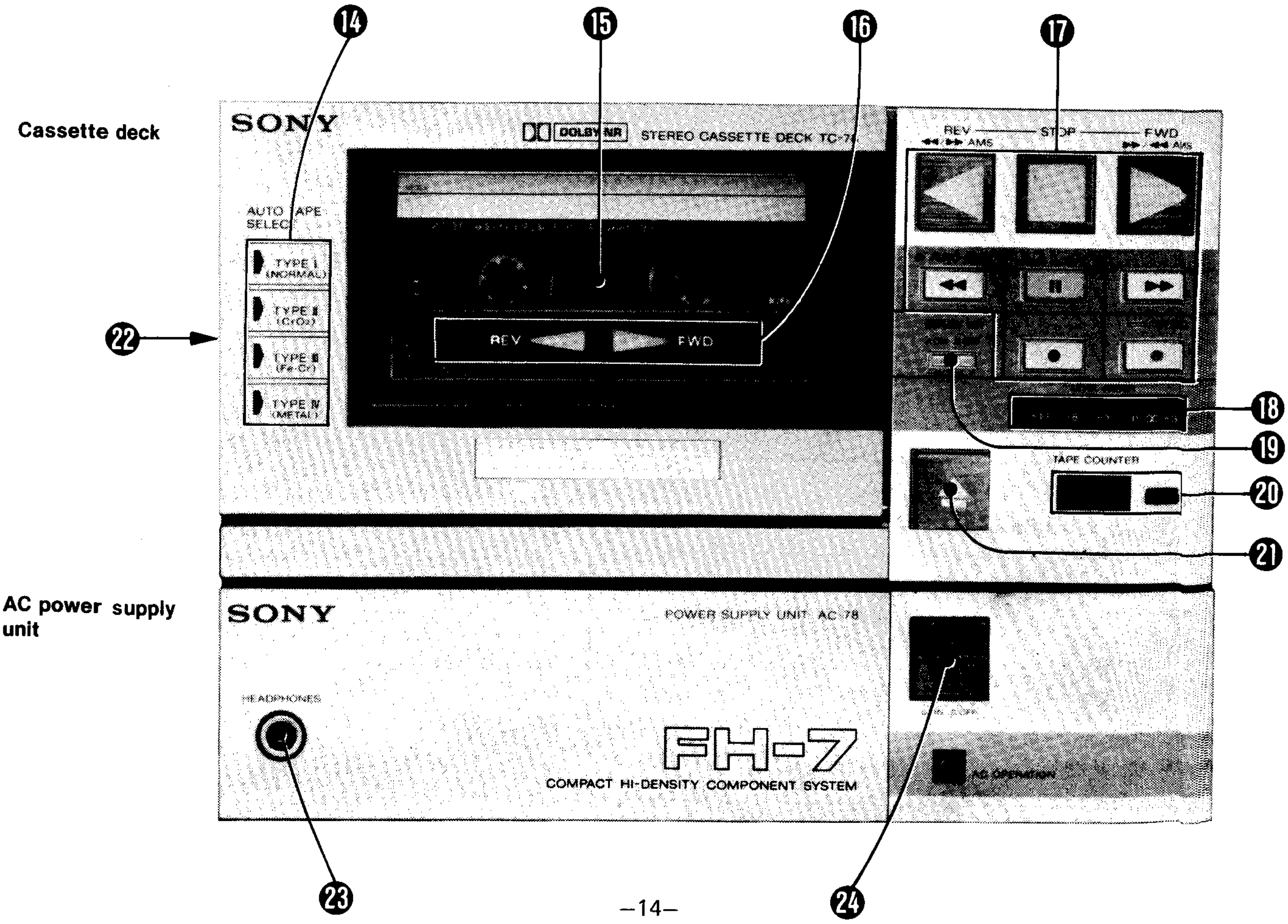
⧈

SERIAL NO.
MADE IN JAPAN

SECTION 1
OUTLINE

FUNCTION OF CONTROLS


Tuner (ST-78S)
Amplifier
SONY
FM STEREO/FM-AM TUNER ST-78S
LIQUID CRYSTAL DIGITAL DISPLAY
STEREO
TUNE
METER BAND
FM
SW2
SW1
MW
BAND
TUNING
SONY
INTEGRATED STEREO AMPLIFIER TA-78
CD/AUX
100Hz
400Hz
1kHz
4kHz
12kHz
PEAK POWER LEVEL
BALANCE
L
R
FUNCTION
CD/AUX
1
2
3
4
5
6
7
8
9
10
11
12
13


Cassette deck
AC power supply unit
SONY
DOLBY NR
STEREO CASSETTE DECK TC-78
AUTO TAPE SELECT
TYPE I (NORMAL)
TYPE II (CrO2)
TYPE III (Fe-Cr)
TYPE IV (METAL)
REV
FWD
REV ◀◀/▶▶ AMS
STOP
FWD ▶▶/◀◀ AMS
TAPE COUNTER
SONY
POWER SUPPLY UNIT AC-78
HEADPHONES
FH-7
COMPACT HI-DENSITY COMPONENT SYSTEM
AC OPERATION
14
15
16
17
18
19
20
21
22
23
24

Tuner ST-78L/78S

(The photo shows the ST-78S tuner.)

❶ Frequency display
Permits reading the received frequency at a glance from the figures.

❷ STEREO indicator
This indicator will light when an FM stereo program of sufficient signal strength is tuned in.

❸ TUNED indicator
Lights up when a signal is tuned in accurately.

❹ METER BAND indicator (for ST-78S)
Lights up to show the receiving frequency is in an SW meter band.

❺ BAND selector
Selects the desired band.
ST-78L : FM, MW or LW.
ST-78S : FM, MW, SW1 or SW2.

❻ TUNING buttons
Press either the " + " or "–" button to change the frequency.
Press the "–" button to go to a lower frequency and the " + " button to go to a higher. To change the frequency rapidly, press the "FAST" button while pressing " + " or "–" button.

❼ Telescopic antenna
Used for FM or SW (only for ST-78S) reception.

Amplifier TA-78

❽ CD/AUX jack
This stereo phone jack allows you to quickly and easily connect a tape recorder for playback. Press PHONO switch of the FUNCTION selectors.

❾ Graphic equalizer controls
Slide downwards or upwards to equalize the reproduced sound (TAPE, PHONO or TUNER).

❿ PEAK POWER LEVEL meters
These meters show the output level of the power amplifier.

⓫ BALANCE control lever
This controls the balance of the left and right channel output level. Normally set the control to the center position.

⓬ FUNCTION selectors
Press the desired program source among tape, tuner, record player or the signal from the CD/AUX jack.

PHONO : For disc programs connected to PHONO inputs or the auxiliary programs connected to the CD/AUX jack. Disconnect the phone plug connected to the CD/AUX jack when reproducing disc programs.
TUNER : For off-the-air programs.
TAPE : For taped programs.

⓭ VOLUME control
This controls the overall output level.

Cassette deck TC-78

⓮ Tape type indicators
The type of the tape being used is automatically detected by the automatic tape selector system and the corresponding indicator lights.

⓯ Cassette holder

⓰Tape direction indicators
During playback or recording, one of the indicators illuminates to show the direction of the tape transport.

⓱ Function buttons
It is possible to switch directly from one mode to another.
- ▶(forward) button : Press this button to play the tape back the front side of the cassette. The tape is transported to the right.
- ▶▶ (fast-forward) button : Press this button to advance the tape rapidly to the right.
- ● (record) button : Press this button together with the ▶ button to start recording. The indicator will illuminate.
- ■ (stop) button : To stop the tape, press this button.
- ❚❚ (pause) button : Perss this button to stop the tape for a moment during recording and play back of the front side of the cassette. To restart, press the button again. This button is also used to release the record mode. (This button does not operate during the reverse mode).
- O(record muting) button : Press this button to eliminate unwanted material and to insert a blank space during recording.
- ◀(reverse) button : Press this button to play the back side of the cassette.
- ◀◀ (fast-reverse) button : Press this button to advance the tape rapidly to the left.

⓲LEVEL METER
These meters show the input level during recording and recorded levels during playback.

⓳ DOLBY NR switch
To record with the Dolby NR* (Noise Reduction) process, depress this switch . To record without the Dolby NR process, press again and release this switch.
When playing back, set this switch to the same position used in recording.

*"Dolby" and the double-D symbol are trade marks of the Dolby Laboratories Licensing Corporation. Noise reduction system manufactured under license from Dolby Laboratories Licensing Corporation.

⓴ TAPE COUNTER and reset button
The tape counter provides a numerical reference point while recording which can be used to index a recorded cassette. To reset to zero, press the reset button.

㉑ ⏏ (eject) button
Press this button to open the cassette holder.

㉒ ISS (Interference suppress switch) (on the rear)
If interference is encountered while recording, MW or LW program, slide the switch to 2 or 3 position depending on which best reduces the noise. Normally set the switch to 1 position.

AC power supply unit AC-78

㉓HEADPHONES jack
Accepts any headphones. The headphone volume can be adjusted with the volume control.

㉔POWER switch
Press to turn on the powers of amplifier, tuner and cassette deck. To turn them off, press it again.

CONNECTIONS

POWER CABLE AND SIGNAL CABLE CONNECTION

Notes

- The connector covers are connected to the male connectors at the factory to protect the connector. Remove the connector covers before connecting the flat cables.
- Turn the POWER switch off when connecting or disconnecting the connector to avoid damaging the speaker.
- Be sure to insert the female connector firmly until it clicks into the male connector. Loose connections may cause hum and noise.

See illust D.

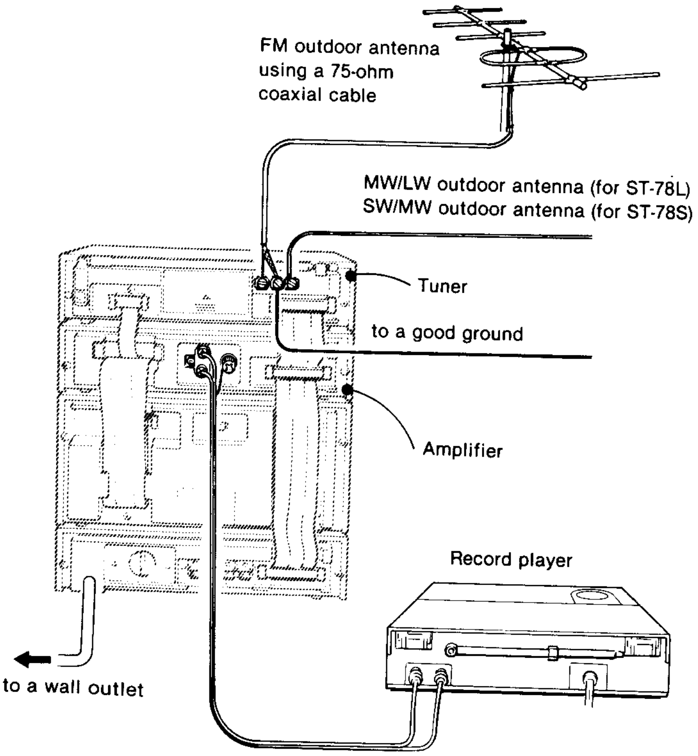
To disconnect the cable

To disconnect the cable, pull the connector out. Never pull the cable itself.

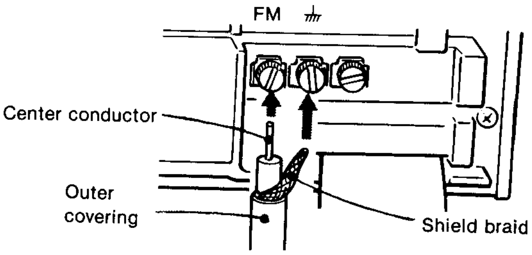
See illust E.

Do not connect the cable this way.
See illust F.

OUTDOOR ANTENNA AND PHONO JACKS CONNECTION


FM outdoor antenna using a 75-ohm coaxial cable
MW/LW outdoor antenna (for ST-78L)
SW/MW outdoor antenna (for ST-78S)
Tuner
to a good ground
Amplifier
Record player
to a wall outlet

75 ohm coaxial cable connection


FM ⏚
Center conductor
Outer covering
Shield braid

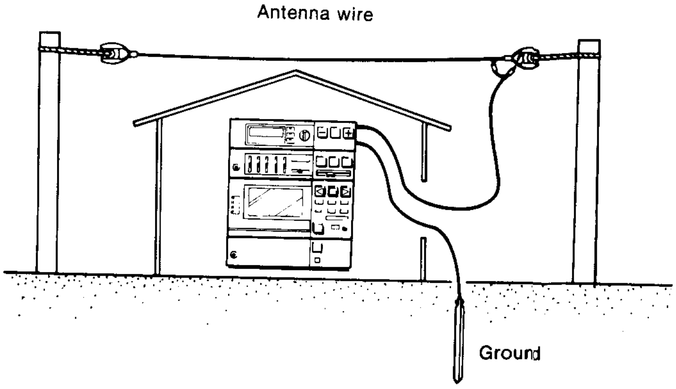
The tuner accepts 75 ohm coaxial cable. It is free from external interference, reduces noise pickup, and is the ideal transmission line for most FM installations.

MW and LW antenna connection (LW for the ST-78L)

In most areas, the built-in ferrite-bar antenna will provide satisfactory reception. In difficult reception areas, it may be necessary to connect a length of insulated wire 5 - 15 meters (20 - 50 feet) long to the MW/LW ANTENNA terminal (for the ST-78L) or SW/MW ANTENNA terminal (for the ST-78S). Extend this out of doors if possible, keeping the greater portion horizontal.

SW antenna connection (for the ST-78S)

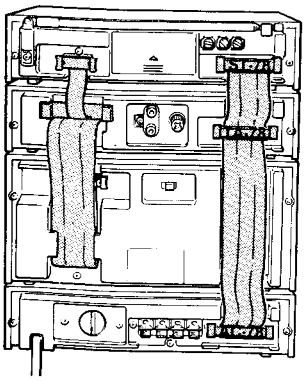
The built-in telescopic antenna will provide satisfactory reception. In difficult reception areas, it may be necessary to connect the SW antenna wire AN-60 to the SW/MW ANTENNA terminal and extend it as high as possible keeping from touching other material or trees. Keep the wire far away from high voltage transmission lines and noisy electrical machinery.


Antenna wire
Ground

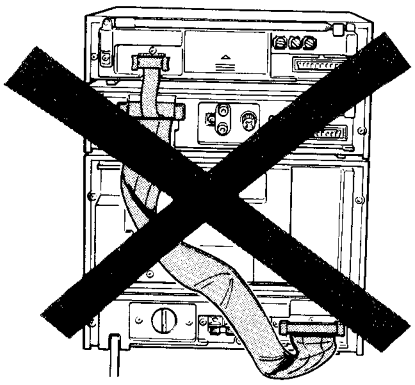
Ground connection [⏚]

When an outdoor antenna is installed, a direct ground is recommended for lightning protection. The use of a lightning arrestor is recommended for any outdoor antenna.

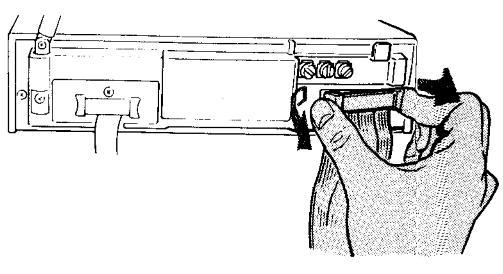
D



F

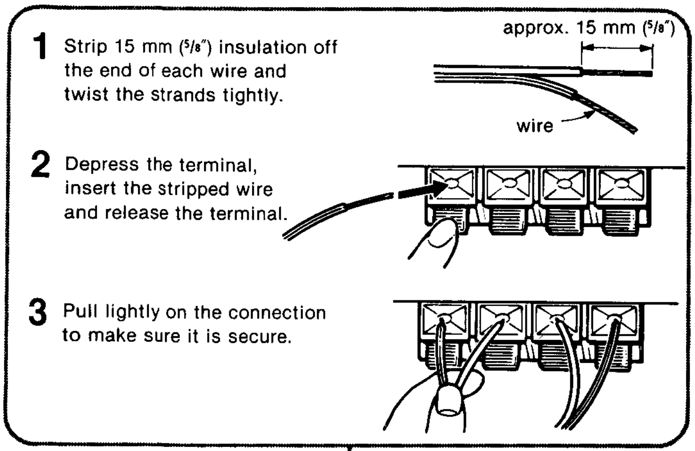


E



SPEAKER SYSTEM CONNECTION

Connect the supplied speaker cords to the input terminals of the speaker and the speaker terminals of the AC power supply unit, i.e., the right speaker to the R terminals and the left speaker to the L terminals, with correct speaker phasing (correct ⊕ and ⊖ connections).

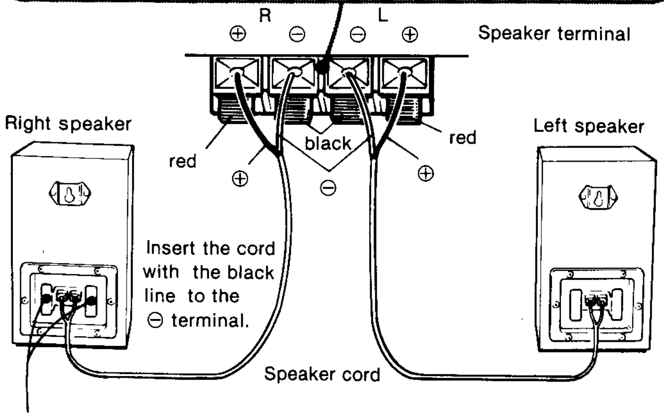


1 Strip 15 mm (5/8") insulation off the end of each wire and twist the strands tightly.

2 Depress the terminal, insert the stripped wire and release the terminal.

3 Pull lightly on the connection to make sure it is secure.

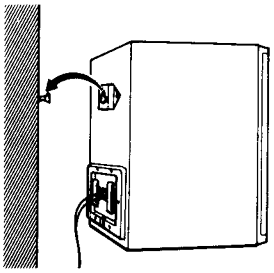
approx. 15 mm (5/8")
wire



R
L
⊕ ⊖ ⊖ ⊕
Speaker terminal
Right speaker
Left speaker
red
black
red
⊕
⊖
⊕
Insert the cord with the black line to the ⊖ terminal.
Speaker cord

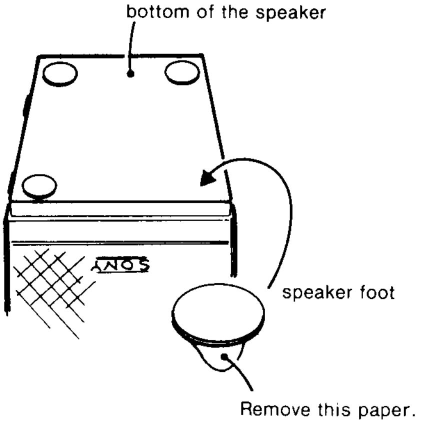
To shorten the speaker cord, wind the excessive cord on these hooks.

To hang on a wall



Note on the supplied feet for the speaker

Attach the supplied feet for the speaker on the bottom of the speaker to prevent the speaker from damage.



bottom of the speaker
speaker foot
Remove this paper.

ON BATTERY

To retain the frequency received on each band while the tuner is turned off, install two batteries in the battery compartment at the rear of the tuner.

INSTALLATION

Be sure to turn off the POWER switch before installing the batteries.
Open the baterry compartment lid, install two batteries, IEC designation R6 (size AA), with the correct polarity as illustrated, then close the lid.

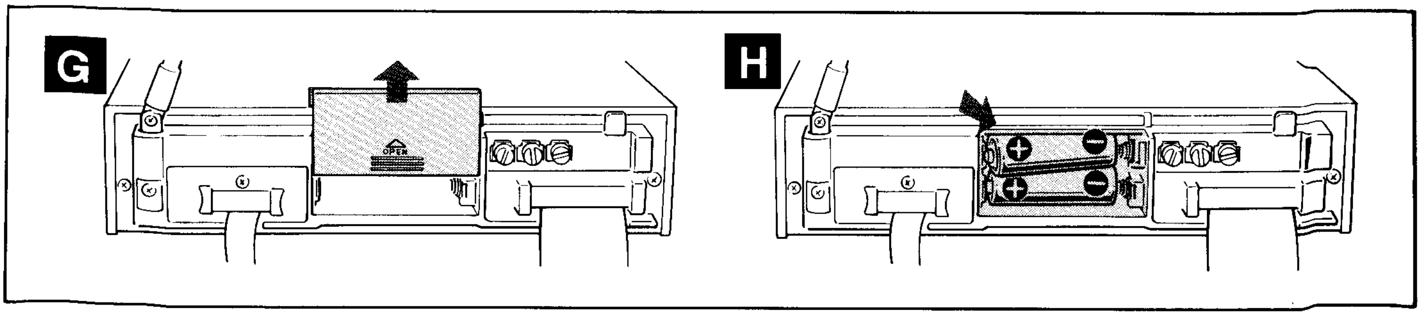
See illust G, H.

Battery life

About one year of operation can be expected when using Sony SUM-3 (NS) New Super Batteries. Be sure to replace the batteries once a year to avoid damage from leaking batteries.

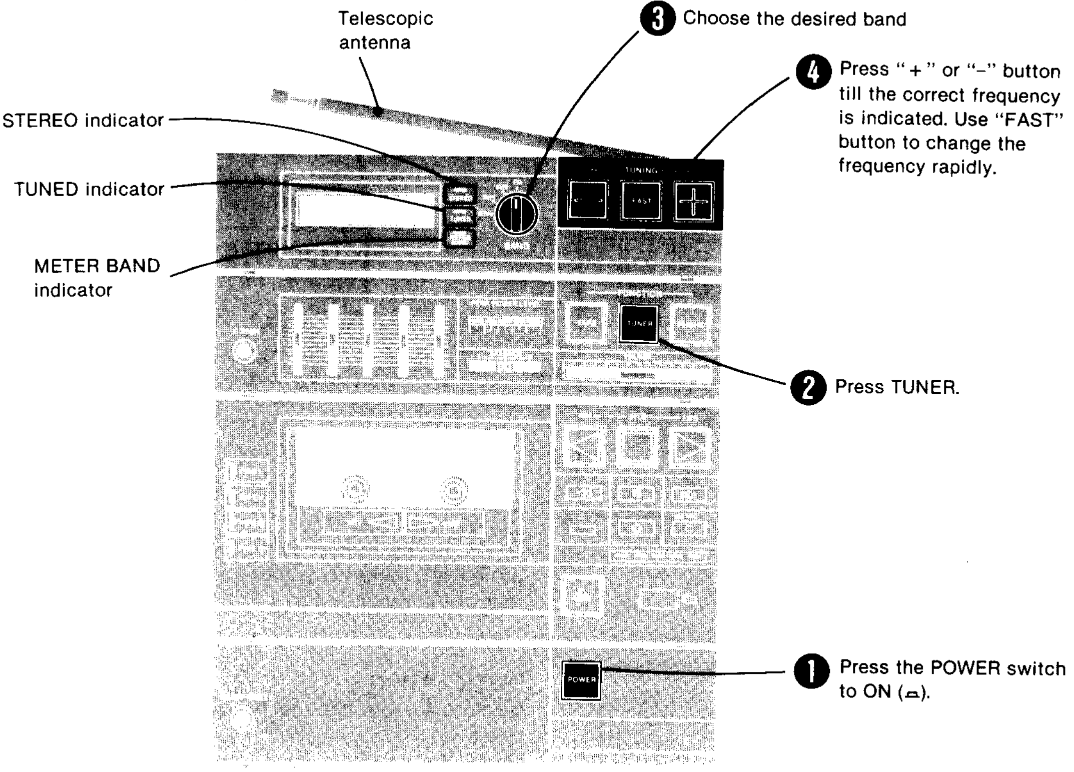
Note

If incorrect figures appear on the frequency display after turning on the POWER switch, turn off the POWER switch, take out and reinstall the memory back-up batteries correctly and tune in the frequency.



OPERATION OF THE TUNER

Follow the numbered sequence.
(The illustration shows the ST-78S tuner)



③ Choose the desired band

④ Press "+" or "–" button till the correct frequency is indicated. Use "FAST" button to change the frequency rapidly.

② Press TUNER.

① Press the POWER switch to ON (▭).

During the tuning, when the frequency access to the station, the searching speed will slow down so that the tuning gets easier. However, when the FAST button is pressed during tuning, the searching speed will not slow down.

- ●STEREO indicator illuminates when an FM stereo program is received.
- ●TUNED indicator illuminates when a station is tuned in.
- ●METER BAND indicator (for ST-78S) illuminates to show the receiving frequency is in an SW meter band.

Adjust the antenna as required.

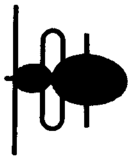
FM: Pull out the telescopic antenna and adjust its length, direction and angle for the best reception.

SW (for ST-78S): Pull out the telescopic antenna to its full length and stand it vertically.

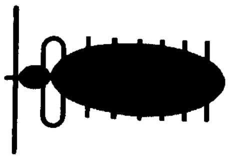
MW/LW (LW for ST-78L): When the BAND selector is set to MW or LW, the built-in ferrite bar antenna is used instead. Since this antenna is directional, rotate the set horizontally for optimum reception, if necessary.

MORE ABOUT FM ANTENNAS

Good FM reception depends not only on tuner sensitivity but on the quality of the received signals. This is determined by the signal strength, the presence of multipath signals* and the geographic location of the FM station. To get the best from your tuner, use an antenna suited to your location.



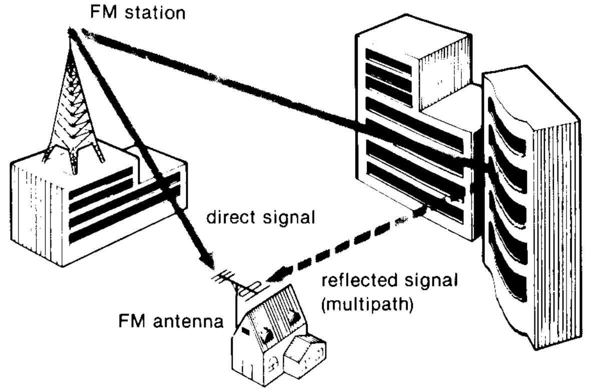
Dipole antenna with reflector and director has increased sensitivity to front signal and reduced sensitivity to rear signals.



Multi-element type has a narrower pickup pattern with high frontal sensitivity and superior rejection of rear and multipath signals. To receive a distant or weak signal station, use this type of antenna.

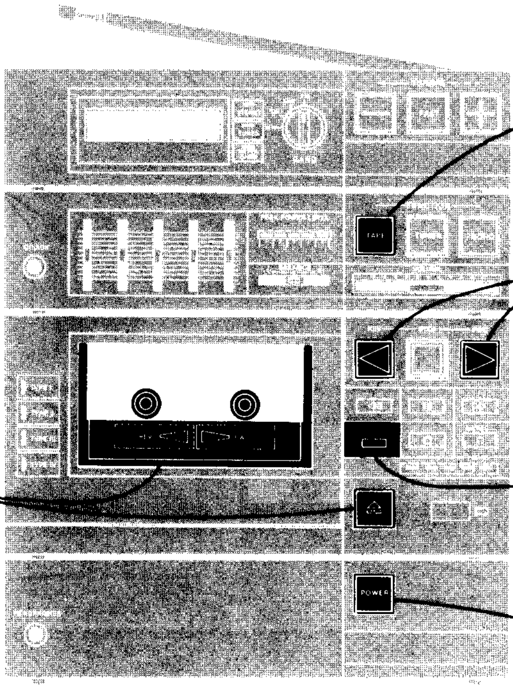
***Multipath signals**

Multipath interference is caused by signal reflections from hills or structures that reach the receiving antenna perceptibly later than a direct signal. The effects of a multipath condition appear as high-frequency noise, distortion, and loss of channel separation of the FM stereo programs. These effects may be eliminated, to a great extent, by using a coaxial lead-in and a good directional antenna that is correctly oriented.



TAPE PLAYBACK

Follow the numbered sequence.



❸ Press TAPE.

❺ Press the ▶ or ◀ button.
See "Auto reverse system" below.
Playback will begin.

❷ Insert the recorded cassette. Switch the TAPE SELECTOR switch on the rear if necessary.
See "Automatic tape select system" on page 15.

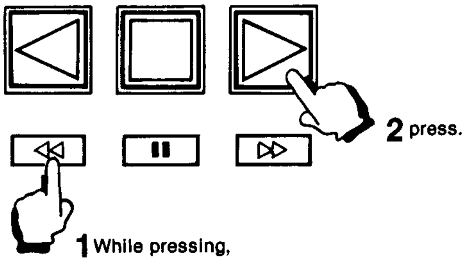
❹ Depress when playing back a tape which has been recorded using the Dolby NR system (ON ▬).

❶ Press the POWER switch to on (▬).

Auto reverse system
Press the ▶ button to play back the front side of the cassette. The playback will be in the reversed side automatically after the tape end of the playback of the front side.
Press the ◀ button to play back the back side of the cassette. The tape will stop when the back side is completely played back.

AUTO PLAY
To rewind the tape and play from the beginning of the tape, use the auto play function. The cassette deck can automatically replay a tape immediately after rewinding.

- Auto play operates only on the playback of the front side of the cassette.



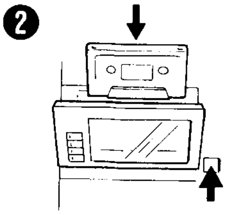
After the tape is completely rewound, the tape will automatically replay.

TAPE RECORDING

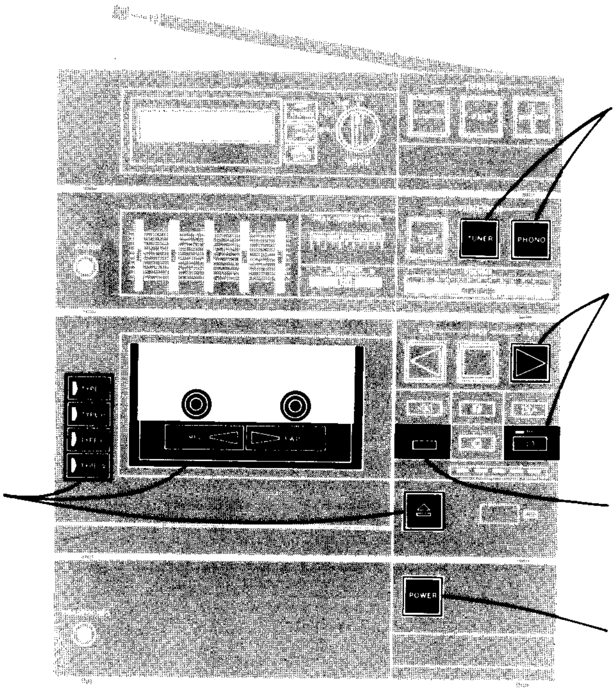
It is only possible to record the front side of the cassette.

TO RECORD
Follow the numbered sequence.

❷



Insert a cassette with the tape surface downwards.
Switch the TAPE SELECTOR switch on the rear if necessary. See "Automatic tape select system" on page 15.



❸ Select the desired program source and play the program.

❺ Press the ▶ and ● buttons at the same time. Recording will begin.

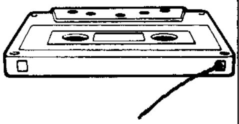
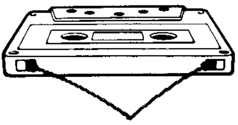
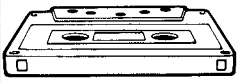
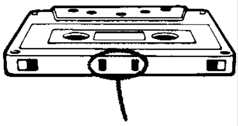
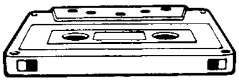
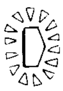
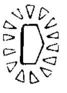
❹ Depress when recording using the Dolby NR system (▭ ON).

❶ Press the POWER switch to ON (▭).

AUTOMATIC RECORDING SYSTEM
No recording level adjustement is necessary with the new automatic recording system.
The recording level is not affected by the volume, BALANCE or graphic equalizer controls, so you can listen to the programat any volume and with any tone adjustments you want while recording.

MORE ACCURATE RECORDING STARTS
You can use the ❚❚ (pause) button to start recording more accurately than is possible when recording is started by pressing both the ● button and the ▶ button.
❶ After completing step❹, press the ❚❚ button.
❷ Hold the ● button down and press the ▶ button.
❸ At the moment you wish to start recording, you need only press the ❚❚ button again.

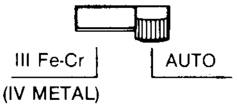
AUTOMATIC TAPE SELECT SYSTEM

	TYPE I (NORMAL) cassette	TYPE II (CrO2) cassette	TYPE III (Fe-Cr) cassette	TYPE IV (METAL) cassette	
Tape detector slots	 the tab	 CrO2 tape detector slots	 same as the TYPE I cassette	 METAL tape detector slots	 METAL tape which has no METAL tape detector slots
TAPE indicator	 TYPE I (NORMAL)	TYPE II (CrO2)	TYPE I (NORMAL)	TYPE IV (METAL)	 TYPE II (CrO2)

With the TAPE SELECTOR switch at the AUTO position, this automatic tape select system is actuated by the detector slots of certain cassettes and automatically sets the optimum recording and playback characteristics.
The tape type detected will be shown by the indicator.

As shown in the above illustrations, when inserting TYPE III (Fe-Cr) cassettes and TYPE IV (METAL) cassettes which have no METAL tape detector slots, the correct TAPE indicator does not light up and the automatic tape select system cannot work properly.
Set the TAPE SELECTOR switch at the rear to the III Fe-Cr (IV METAL) position when using these cassettes.

TAPE SELECTOR



Tape list

Tapes (C-60 and C-90)		Type of tape
SONY : AHF, BHF, CHF BASF : LH-X, Professional I MAXELL : UD, UD-XL I, XL I-S SCOTCH : MASTER I	AGFA : SUPER FERRO DYNAMIC FUJI : FX-I PHILIPS : SUPER FERRO-I TDK : AD	TYPE I (NORMAL)
SONY : UCX-S, CD-α BASF : Professional II MAXELL : UD-XLII, XLII-S SCOTCH : MASTER II	AGFA : STEREO CHROM FUJI : FX-II PHILIPS : CHROMIUM TDK : SA, SA-X	TYPE II (CrO_2)
SONY : FeCr BASF : Professional III SCOTCH : MASTER III	AGFA : CARAT PHILIPS : FERRO CHROMIUM	TYPE III (Fe-Cr)
SONY : METALLIC	Other metal tapes	TYPE IV (METAL)

RECORD MUTING

By pressing the ○ (record muting) button during recording, four seconds interspacing is provided automatically, eliminating unwanted program material such as broadcasting commercials. While the record muting is operating, the incoming signal is not recorded on the tape but it continues to register on the meters and feed to the monitor so that you know exactly what is going on.

❶ Press the ○ button when the segment you do not want to record begins. The indicator of the ❚❚ button will blink, and the tape path will pause automatically after four seconds.

❷ When you want to resume recording, press the ❚❚ button.

To insert a blank over four seconds long

Hold down the ○ button for as long as you want the blank segment on the tape to be. After four seconds, the indicator of the ❚❚ button will blink more rapidly. When you release the ○ button, the tape deck will be in the pause mode. When you want to resume recording, press the ❚❚ button to release the pause mode.

ERASING

When the cassette deck functions in recording mode, the erase head automatically erases any previously recorded material.
To erase without recording :

❶ Make sure that the safety tab of the cassette is in place, or that the tab slot is covered with plastic tape.

❷ Insert the cassette to be erased and check that the tape type indicator corresponds to the type of tape inserted. Switch the TAPE SELECTOR switch if the indicator and the tape do not correspond.

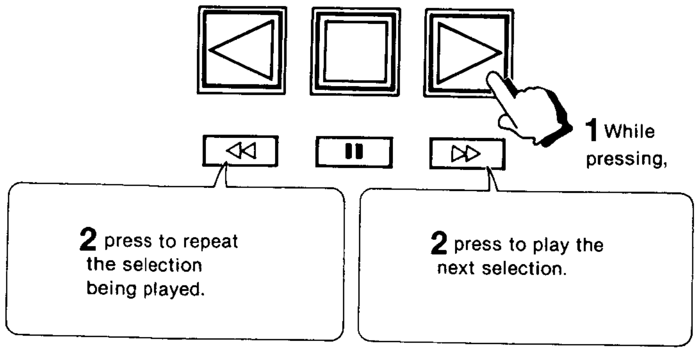
❸ Press the TAPE button of the FUNCTION selector.

❹ While holding the ● button down, press the ▶ button.

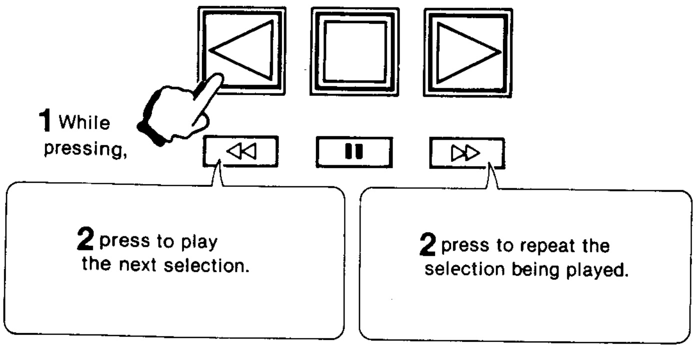
AUTOMATIC MUSIC SENSOR (AMS) SYSTEM

During playback, use the Automatic Music Sensor (AMS) to locate the beginning of the selection being played or the following selection. The AMS searches for the blank space between selections, and playback will start automatically from the begining of the selection.

During forward playback


1 While pressing,
2 press to repeat the selection being played.
2 press to play the next selection.

During reverse playback


1 While pressing,
2 press to play the next selection.
2 press to repeat the selection being played.

At the beginning of the selection, the ◀◀ or ▶▶ button will be released and playback will begin.

To assure the AMS operation

- To search for the beginning of the selection being played, wait about 15 seconds after the selection starts before pressing the ◀◀ or ▶▶ button; otherwise the previous selection will be played back.
- To search for the begining of the following selection, do not press the ▶▶ button immediately before the starting point of the following selection; otherwise playback might begin from the beginning of the selection after the following one.

Notes on the blank spaces

- Since AMS works by searching out the blank spaces on a tape, it may not operate if there is noise in the space between selections, or if the space is less than 4 seconds long.

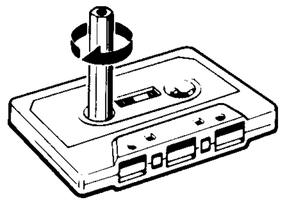
The record muting facility of this tape deck can make a four second blank space that will assure AMS operation on any recorded tape.

- If the record music includes a long pause, or if it continues for a time at sufficiently low volume, as may happen for instance with classical music, or if any selection is less than 20 seconds long, the AMS will treat it as a blank.

NOTES ON CASSETTES

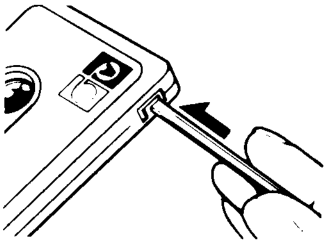
Cassette insertion

- Before inserting a cassette, take up any slack in the tape to prevent it from becoming tangled around the capstan.

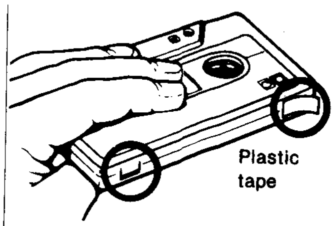


To protect cassettes from accidental erasure

Remove the tab as illustrated so that the record mode does not function when the record button is pressed. To record on a cassette once tabs have been removed, simply cover the slot with plastic tape.

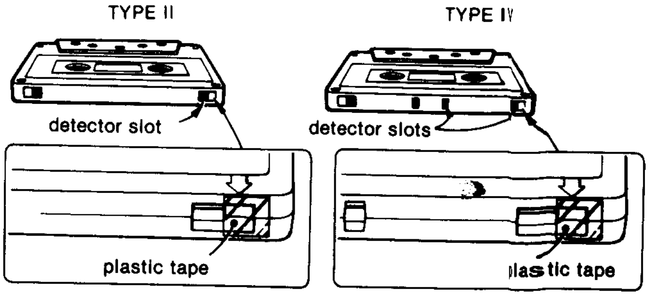


To protect side A recording


Plastic tape

Do not stick any material on the cassette except for tape on the circled portions.

- Be careful not to cover the detector slots of the TYPE II (CrO_2 tape) and TYPE IV (metal tape) cassettes.

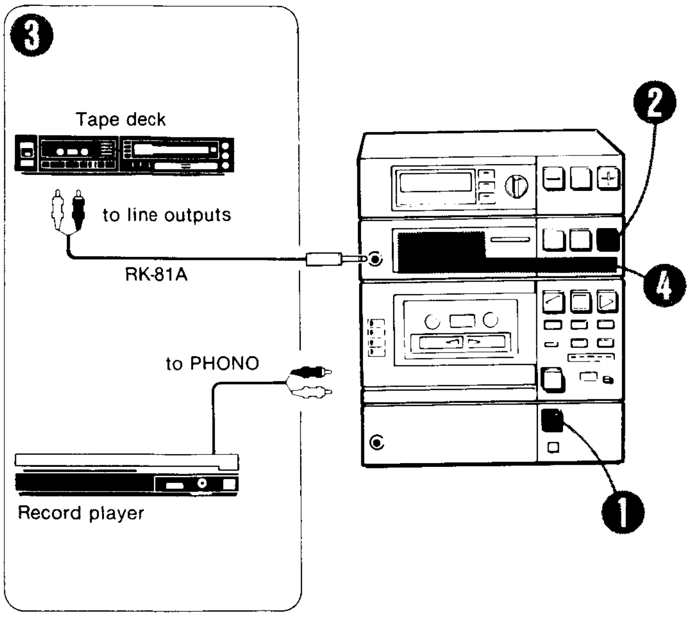

TYPE II
TYPE IV
detector slot
detector slots
plastic tape
plastic tape

Cassette care

- Do not stick thick paper or tape onto the cassette, as this may affect proper cassette alignment and prevent proper tape contact with the head.
- Keep cassetts away from magnetic equipment such as speakers, amplifiers, etc., as erasure or distortion on your recorded tape could occur.
- Do not expose a cassette to direct sunlight, extremely cold temperatures or moisture.

REPRODUCTION OF PHONO OR CD/AUX PROGRAM SOURCES

You can listen to or record the disc program connected to the PHONO jacks or the auxiliary input sources such as another tape deck or compact disc player connected to the CD/AUX jack using Sony RK-81A connecting cord (optional).



❶Press the POWER switch.
❷Press the PHONO button of the FUNCTION selectors.
❸Play the program source.
❹Adjust the volume, equalizer controls and stereo balance.

The CD/AUX jack has priority over the PHONO jacks. If the CD/AUX jack and PHONO jacks are both connected and the PHONO button is depressed, you cannot listen to the record programs.

SOUND ADJUSTMENTS

STEREO BALANCE

Adjust the BALANCE control as necessary to produce a well defined stereo image.

TONE CONTROLS USING THE GRAPHIC EQUALIZER CONTROLS

Each graphic equalizer control has boost/cut range of 10 dB. The level of a band will be increased by sliding a control upwards, and decreased by sliding it downwards.
To equalize the sound, first set all equalizer controls at their 0 dB center position and lay the program. Slide the control of the frequency band to be equalized upwards or downwards until you perceive an improvement.

Frequency coverage of each equalizer control

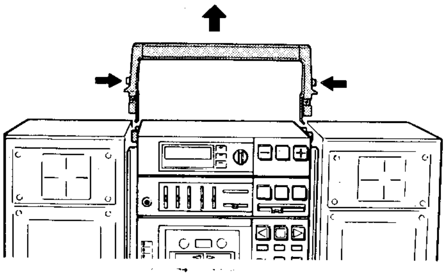
100 Hz: Use this control to boost or cut the bass.
400 Hz: Use this control to adjust the middle frequency range-the human voice and the middle frequencies of instrumental music.
1 kHz: Use this control to provide more presence fo vocals.
4 kHz: Use this control to adjust the brightness of sound.
12 kHz: This control effects general treble. Slide downward to reduce high frequency noise, such as tape hiss.

SECTION 2
DISASSEMBLY

REMOVAL

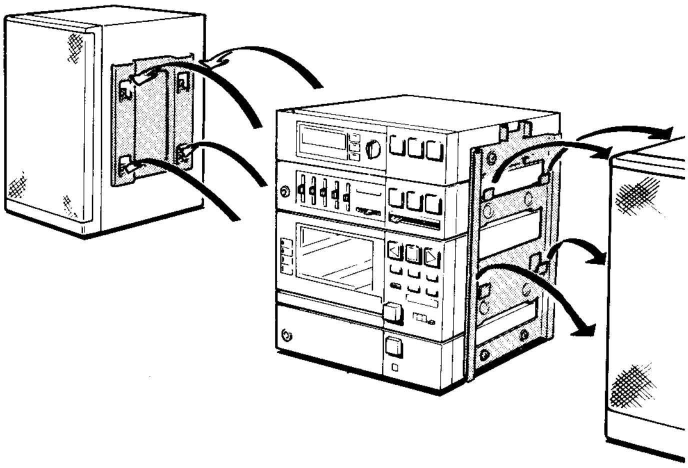
HANDLE

Pull out handle by pushing the button of both sides.

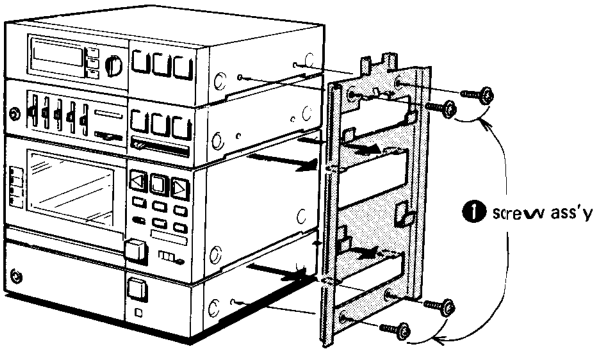


SPEAKERS

Remove speakers.

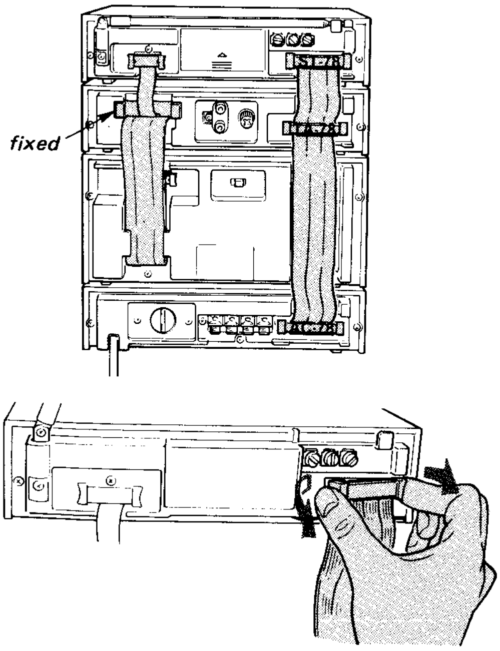


SIDE PLATE


① screw ass'y

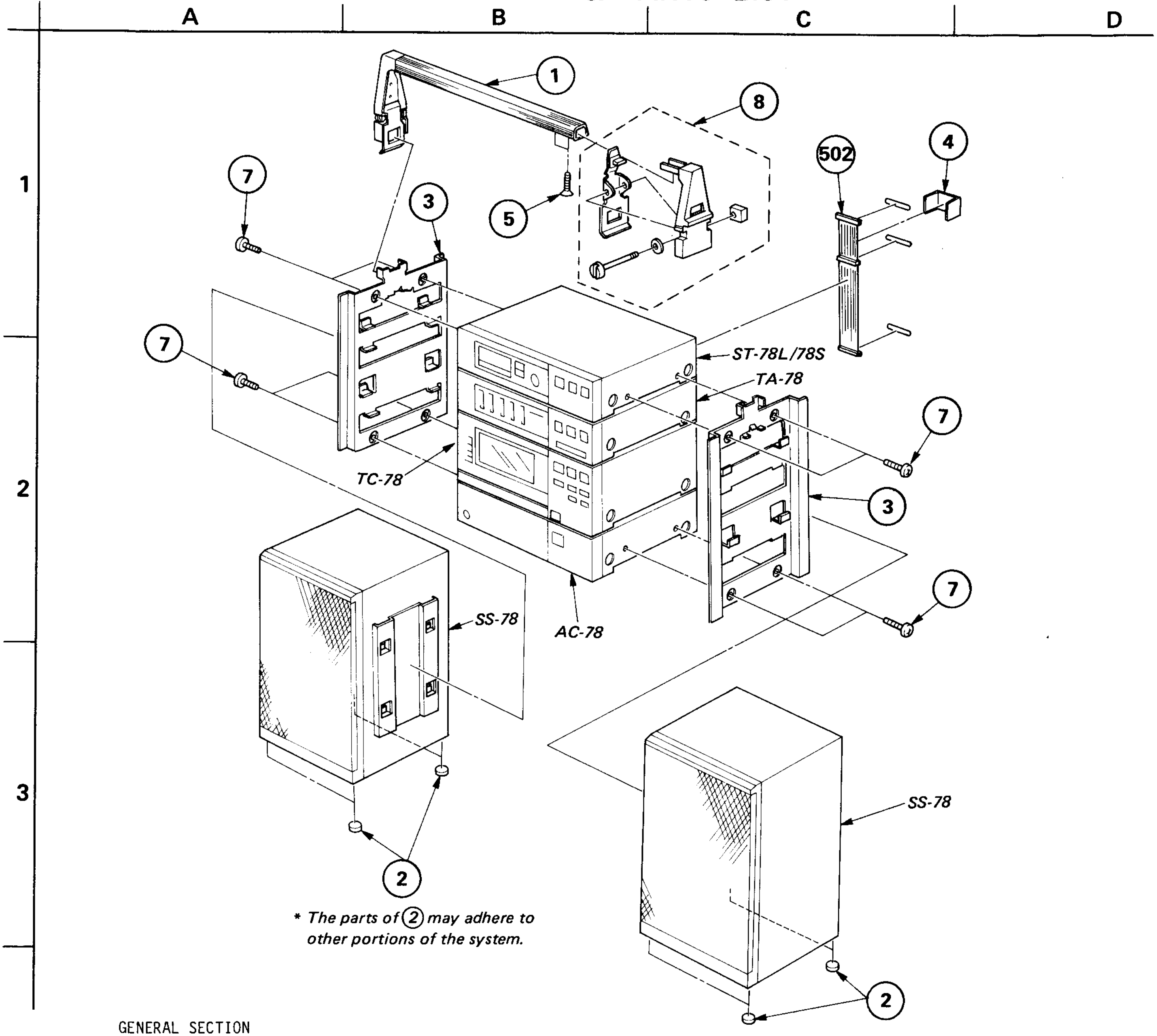
② Pull out both side plates.

CONNECTORS


fixed
ST-78
TA-78
AC-78

Remove connectors.

SECTION 3
EXPLODED VIEW & PARTS LIST



* The parts of ② may adhere to other portions of the system.

GENERAL SECTION

No.	Part No.	Description
1	2-249-402-11	HANDLE
2	4-883-915-00	FOOT
3	4-884-807-00	PLATE (A), SIDE
4	4-884-875-00	LABEL (A) (CONNECTOR), CAUTION
5	7-682-248-09	SCREW +K 3X8
6	....	
7	X-4884-807-0	SCREW ASSY, SIDE PLATE
8	X-4884-813-1	HANDLE ASSY

ACCESSORY & PACKING MATERIAL

Part No.	Description
3-701-613-00	BAG, POLYETHYLENE
3-701-630-00	BAG, POLYETHYLENE
3-773-106-11	(ENGLISH,FRENCH,SPANISH,ITALY) ....MANUAL, INSTRUCTION
3-773-106-41	(AEP/GERMAN,DUTCH,SWEDISH) ....MANUAL, INSTRUCTION
3-773-106-51	(FOR GERMANY/ENGLISH,FRENCH,GERMAN) ....MANUAL INSTRUCTION
3-793-828-11	QUESTIONNAIRE
3-795-491-11	(E2)...INSTRUCTION
4-884-884-00	SHEET, PROTECTION
4-884-885-00	SHEET, PROTECTION
4-884-886-00	CUSHION (REAR), UPPER
4-884-887-00	INDIVIDUAL CARTON
4-884-888-00	CUSHION (FRONT), UPPER
4-884-889-00	BOX, ACCESSORY
4-884-890-00	CUSHION (LOWER)
4-884-945-00	PARTITION
♠;4-884-957-00	PROTECTOR
X-3701-105-0	ROD ASSY, CLEANING, HEAD

ELECTRICAL PARTS

No.	Part No.	Description
501	1-555-839-21	CORD, SPEAKER
502	1-556-477-00	CORD (WITH CONNECTOR)

NOTE: · Items marked " ♠ " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

TROUBLE CHECKS

The following checks will assist in the correction of most problems which you may encounter with your set.
Before going through the check list below, first pay attention to the followng fundamental points.

- The power cord must be connected firmly.
- The speaker connection must also be firm.
- The cables must be connected firmly.

RADIO PROGRAM RECEPTION

The TUNED indicator reading is unstable.

- Adjust the antenna.

The STEREO indicator flickers

- Adjust the antenna.

Severe hum or noise

- The signal strength is too weak.
Connect the external antenna. See page 10 or 11.
- Adjust the antenna.
- Connect the ground wire.

Last station memory is not retained

- Check that the batteries for retaining the frequency are installed correctly.

CASSETTE DECK OPERATION

The ● button cannot be depressed.

- No cassette in the cassette holder.
- The tab is removed from the cassette. See page 16.

The ● button or ▶ button cannot be depressed.

- The tape is wound completely.

Tape does not move even when the ▶ button is pressed.

- The ❚❚ button is depressed.

Recording or playback cannot be made or there is a decrease in sound level.

- Dirty heads.
- Magnetic contamination on the record/playback head.
- Improper setting of the FUNCTION selectors.

Excessive wow or flutter, or sound drop-out.

- Contamination of the capstan or pinch roller.

Insufficient erasure

- Magnetic contamination of the erase head.

Increase of noise or erasure of high frequencies

- Magnetic built- up of the erase head.

Unbalanced tone in higher frequencies

- Improper setting of the DOLBY NR switch. If recorded with the switch set to ON, play back with it at ON. If recorded with it set to OFF, play back with it at OFF.
- Improper setting of the TAPE SELECTOR switch. See page 15. If recorded in the wrong position, adjust the tone controls in playback.

Incorrect AMS operation

- Blank space between the selections may be too short.

GENERAL

No audio

- Slide the volume control to the right.
- Check the FUNCTION selector setting.

No audio from one channel or unbalanced left and right volume

- Adjust the BALANCE control.
- Check the speaker connections of the inoperative channel.

Reverse left and right sound

- Check the speaker cord connection and speaker location.

Lack of bass sound or apparently imprecise physical location or musical instruments

- Check the speaker connection for proper phasing.

ELECTROLYTIC CAPACITORS

			RATING			→ : Use the high voltage rated one.
CAP. (μF)	6.3 VOLT.	10 VOLT.	16 VOLT.	25 VOLT.	35 VOLT.	50 VOLT.
	PART No.	PART No.	PART No.	PART No.	PART No.	PART No.
0.47					→	1-121-726-00
1.0					→	1-121-391-00
2.2					→	1-121-450-00
3.3	→	→	→	1-121-392-00	→	1-121-393-00
4.7	→	→	→	1-121-395-00	→	1-121-396-00
10	→	→	1-121-651-00	1-121-398-00	→	1-121-738-00
22	→	→	1-121-479-00	1-121-480-00	1-121-662-00	1-121-152-00
33	→	→	1-121-403-00	1-121-404-00	1-121-652-00	1-121-405-00
47	→	1-121-352-00	1-121-409-00	1-121-410-00	1-121-653-00	1-121-411-00
100	→	1-121-414-00	1-121-415-00	1-121-416-00	1-121-357-00	1-121-417-00
220	1-121-419-00	1-121-420-00	1-121-421-00	1-121-422-00	1-121-261-00	1-121-423-00
330	1-121-751-00	1-121-805-00	1-121-521-00	1-121-654-00	1-121-655-00	1-121-656-00
470	1-121-424-00	1-121-425-00	1-121-426-00	1-121-733-00	1-121-361-00	1-121-810-00
1000	–	1-121-736-00	1-121-245-00	1-121-657-00	1-121-388-00	1-123-061-00
2200	1-121-658-00	1-121-659-00	1-121-660-00	1-123-067-00	1-121-984-00	–
3300	1-121-661-00	1-123-075-00	1-123-071-00	–	–	–

CAP. (μF)	100 VOLT.	160 VOLT.	250 VOLT.	350 VOLT.
	PART No.	PART No.	PART No.	PART No.
0.47	–	–	–	–
1.0	1-123-249-00	1-123-252-00	1-123-003-00	1-121-168-00
2.2	1-123-250-00	1-123-026-00	–	1-123-028-00
3.3	1-121-995-00	–	1-123-004-00	1-123-006-00
4.7	1-123-255-00	1-121-246-00	1-121-759-00	1-123-007-00
10	1-121-126-00	1-121-999-00	1-123-254-00	1-123-008-00
22	1-121-996-00	1-123-253-00	1-123-005-00	1-123-022-00
33	1-121-997-00	1-121-757-00	–	–
47	1-123-251-00	1-121-919-00	–	–
100	1-123-084-00	–	–	–

CERAMIC CAPACITORS

				RATING			
CAP. (pF)	50 VOLT.	CAP. (pF)	50 VOLT.	CAP. (pF)	50 VOLT.	CAP. (μF)	50 VOLT.
	PART No.		PART No.		PART No.		PART No.
0.5	1-101-837-00	22	1-102-959-00	150	1-101-361-00	0.001	1-102-074-00
0.75	1-101-586-00	24	1-102-960-00	160	1-101-367-00	0.0012	1-102-118-00
1.0	1-102-934-00	27	1-102-961-00	180	1-102-976-00	0.0015	1-102-119-00
1.5	1-101-576-00	30	1-102-962-00	200	1-102-977-00	0.0018	1-102-120-00
2.0	1-102-935-00	33	1-102-963-00	220	1-102-978-00	0.0022	1-102-121-00
3	1-102-936-00	36	1-102-964-00	240	1-102-979-00	0.0027	1-102-122-00
4	1-102-937-00	39	1-102-965-00	270	1-102-980-00	0.0033	1-102-123-00
5	1-102-942-00	43	1-102-966-00	300	1-102-981-00	0.0039	1-102-124-00
6	1-102-943-00	47	1-101-880-00	330	1-102-820-00	0.0047	1-102-125-00
7	1-102-944-00	51	1-101-882-00	360	1-102-821-00	0.0056	1-102-126-00
8	1-102-945-00	56	1-101-884-00	390	1-102-822-00	0.0068	1-102-127-00
9	1-102-946-00	62	1-101-886-00	430	1-102-823-00	0.0082	1-102-128-00
10	1-102-947-00	68	1-101-888-00	470	1-102-824-00	0.01	1-102-129-00
11	1-102-948-00	75	1-101-890-00	510	1-101-059-00	0.022	1-101-005-00
12	1-102-949-00	82	1-102-971-00	560	1-102-115-00	0.047	1-101-006-00
13	1-102-950-00	91	1-102-972-00	680	1-102-116-00		
15	1-102-951-00	100	1-102-973-00	820	1-102-117-00		
16	1-102-952-00	110	1-102-815-00				
18	1-102-953-00	120	1-102-816-00				
20	1-102-958-00	130	1-101-081-00				

0.001μF = 1,000pF

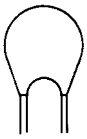
CERAMIC (SEMICONDUCTOR) CAPACITORS

			RATING		→ : Use the high voltage rated one.
CAP. (μF)	25 VOLT.	50 VOLT.	CAP. (μF)	25 VOLT.	50 VOLT.
	PART No.	PART No.		PART No.	PART No.
0.001	→	1-161-039-00	0.018	1-161-016-00	1-161-054-00
0.0012	→	1-161-040-00	0.022	1-161-017-00	1-161-055-00
0.0015		1-161-041-00	0.027	1-161-018-00	1-161-056-00
0.0018		1-161-042-00	0.033	1-161-019-00	1-161-057-00
0.0022		1-161-043-00	0.039	1-161-010-00	1-161-058-00
0.0027	→	1-161-044-00	0.047	1-161-021-00	1-161-059-00
0.0033	→	1-161-045-00	0.056	→	1-161-060-00
0.0039	→	1-161-046-00	0.068	→	1-161-061-00
0.0047	→	1-161-047-00	0.082	1-161-024-00	1-161-062-00
0.0056	→	1-161-048-00	0.1	1-161-025-00	1-161-063-00
0.0068	→	1-161-049-00			
0.0082	1-161-012-00	1-161-050-00			
0.01	1-161-013-00	1-161-051-00			
0.012	→	1-161-052-00			
0.015	1-161-015-00	1-161-053-00			

MYLAR CAPACITORS

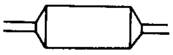
	RATING										
CAP. (μF)	50 VOLT.	100 VOLT.	200 VOLT.	CAP. (μF)	50 VOLT.	100 VOLT.	200 VOLT.	CAP. (μF)	50 VOLT.	100 VOLT.	200 VOLT.
	PART No.	PART No.	PART No.		PART No.	PART No.	PART No.		PART No.	PART No.	PART No.
0.001	1-108-227-00	1-108-365-00	1-108-409-00	0.01	1-108-239-00	1-108-377-00	1-108-421-00	0.1	1-108-251-00	1-108-389-00	1-108-433-00
0.0012	1-108-351-00	1-108-366-00	1-108-410-00	0.012	1-108-357-00	1-108-378-00	1-108-422-00	0.12	1-108-363-00	1-108-390-00	1-108-434-00
0.0015	1-108-228-00	1-108-367-00	1-108-411-00	0.015	1-108-240-00	1-108-379-00	1-108-423-00	0.15	1-108-252-00	1-108-391-00	1-108-435-00
0.0018	1-108-352-00	1-108-368-00	1-108-412-00	0.018	1-108-358-00	1-108-380-00	1-108-424-00	0.18	1-108-364-00	1-108-392-00	1-108-436-00
0.0022	1-108-230-00	1-108-369-00	1-108-413-00	0.022	1-108-242-00	1-108-381-00	1-108-425-00	0.22	1-108-254-00	1-108-393-00	1-108-437-00
0.0027	1-108-353-00	1-108-370-00	1-108-414-00	0.027	1-108-359-00	1-108-382-00	1-108-426-00	0.27	1-108-854-00	–	–
0.0033	1-108-232-00	1-108-371-00	1-108-415-00	0.033	1-108-244-00	1-108-383-00	1-108-427-00	0.33	1-108-855-00	–	–
0.0039	1-108-354-00	1-108-372-00	1-108-416-00	0.039	1-108-360-00	1-108-384-00	1-108-428-00	0.39	1-108-856-00	–	–
0.0047	1-108-234-00	1-108-373-00	1-108-417-00	0.047	1-108-246-00	1-108-385-00	1-108-429-00	0.47	1-108-857-00	–	–
0.0056	1-108-355-00	1-108-374-00	1-108-418-00	0.056	1-108-361-00	1-108-386-00	1-108-430-00				
0.0068	1-108-237-00	1-108-375-00	1-108-419-00	0.068	1-108-249-00	1-108-387-00	1-108-431-00				
0.0082	1-108-356-00	1-108-376-00	1-108-420-00	0.082	1-108-362-00	1-108-388-00	1-108-432-00				

TANTALUM CAPACITORS



	RATING				→: Use the high voltage rated one.		
CAP. (μF)	3.15 VOLT.	6.3 VOLT.	10 VOLT.	16 VOLT.	20 VOLT.	25 VOLT.	35 VOLT.
	PART No.	PART No.	PART No.	PART No.	PART No.	PART No.	PART No.
0.01					→	→	1-131-396-00
0.015						→	1-131-397-00
0.022						→	1-131-398-00
0.033						→	1-131-399-00
0.047						→	1-131-400-00
0.068					→	→	1-131-401-00
0.1					→	→	1-131-402-00
0.15					→	→	1-131-403-00
0.22					→	→	1-131-404-00
0.33					→	1-131-409-00	1-131-405-00
0.47	–	–	–	–	1-131-412-00	→	1-131-406-00
0.68	–	–	–	1-131-415-00	→	1-131-410-00	1-131-407-00
1.0	–	–	1-131-418-00	–	1-131-413-00	→	1-131-408-00
1.5	–	1-131-421-00	–	1-131-416-00	→	1-131-411-00	1-131-348-00
2.2	1-131-424-00	–	1-131-419-00	–	1-131-414-00	1-131-355-00	1-131-349-00
3.3	–	1-131-422-00	–	1-131-417-00	1-131-362-00	1-131-356-00	1-131-350-00
4.7	1-131-425-00	–	1-131-420-00	1-131-369-00	1-131-363-00	1-131-357-00	1-131-351-00
6.8	–	1-131-423-00	1-131-376-00	1-131-370-00	1-131-364-00	1-131-358-00	1-131-352-00
10	1-131-426-00	1-131-383-00	1-131-377-00	1-131-371-00	1-131-365-00	1-131-359-00	1-131-353-00
15	1-131-390-00	1-131-384-00	1-131-378-00	1-131-372-00	1-131-366-00	1-131-360-00	–
22	1-131-391-00	1-131-385-00	1-131-379-00	1-131-373-00	1-131-367-00		
33	1-131-392-00	1-131-386-00	1-131-380-00	1-131-374-00			
47	1-131-393-00	1-131-387-00	1-131-381-00	–			
68	1-131-394-00	1-131-388-00	–	–			
100	1-131-395-00	–	–	–			

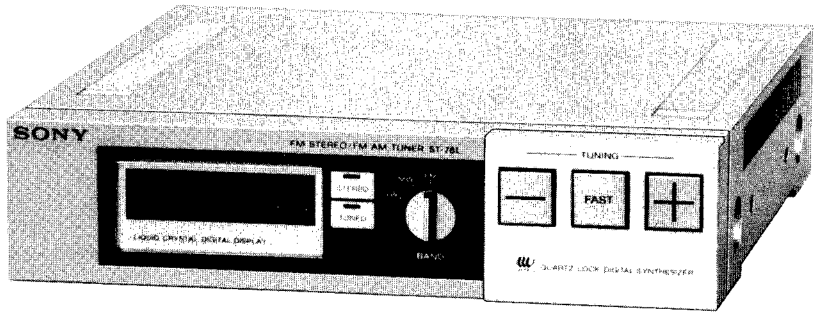
TANTALUM CAPACITORS



	RATING					
CAP. (μF)	3 VOLT.	6.3 VOLT.	10 VOLT.	16 VOLT.	20 VOLT.	35 VOLT.
	PART No.	PART No.	PART No.	PART No.	PART No.	PART No.
0.033						1-131-273-00
0.047						1-131-274-00
0.068						1-131-275-00
0.1						1-131-276-00
0.15						1-131-277-00
0.22			–	–	1-131-262-00	1-131-278-00
0.33			–	–	1-131-263-00	1-131-279-00
0.47			1-131-169-00	–	1-131-264-00	1-131-280-00
0.68			–	1-131-258-00	1-131-265-00	1-131-281-00
1.0			1-131-254-00	–	1-131-266-00	1-131-282-00
1.5		1-131-250-00	–	–	1-131-267-00	1-131-283-00
2.2		–	–	1-131-259-00	1-131-268-00	1-131-284-00
3.3		–	1-131-255-00	–	1-131-269-00	–
4.7		1-131-251-00	1-131-171-00	–	1-131-270-00	–
6.8		–	–	1-131-260-00	1-131-271-00	–
10	–	–	1-131-256-00	–	1-131-272-00	–
15	–	1-131-252-00	–	1-131-261-00		
22	–	–	1-131-257-00	–		
33	1-131-176-00	1-131-253-00	1-131-173-00	–		
47	1-131-288-00	1-131-174-00	–	–		
100	1-131-177-00					

FM STEREO/FM-AM TUNER
〔ST-78L〕

AEP Model
UK Model


SONY
FM STEREO/FM-AM TUNER ST-78L
TUNING
FAST
LIQUID CRYSTAL DIGITAL DISPLAY
QUARTZ LOCK DIGITAL SYNTHESIZER

Note: ST-78L is an FM stereo/FM-AM tuner in FH-7.

MELF (Metal Electrodes Face-Bonding) Components (AEP, E Model)

Warning

If MELF components are forcibly removed from the printed circuit board with pincers or pliers, the circuit board pattern is likely to peel away. Always remove MELF components according to the procedure described on the next page. Replace MELF components with the lead type components.

MELF components are soldered directly to the surface of the printed circuit board.

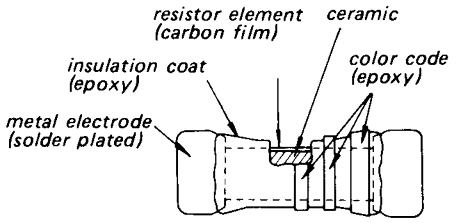
MELF resistors and capacitors have the same dimensions and are distinguished by their background colors: light brown for resistors, and pink or light green for capacitors.

The MELF resistor color coding is the same as for conventional resistors, and MELF capacitor color coding is the same as for tube-type ceramic capacitors. Note, however, that all MELF resistors are rated at ¼W and ±5%.

Components larger than resistors and without a color code are cross conductors, which are used instead of jumper wires.

1. Structure

(Resistors)


resistor element (carbon film)
ceramic
insulation coat (epoxy)
color code (epoxy)
metal electrode (solder plated)

(Capacitors)

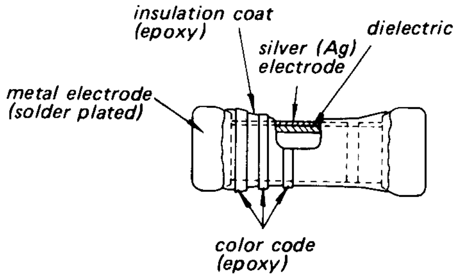
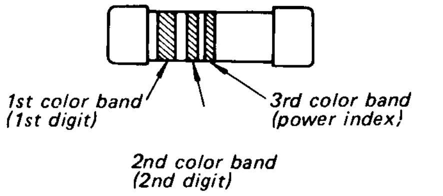
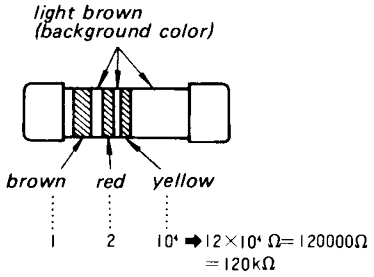

insulation coat (epoxy)
dielectric
silver (Ag) electrode
metal electrode (solder plated)
color code (epoxy)

Fig. 1

2. Color Code Reading


1st color band (1st digit)
3rd color band (power index)
2nd color band (2nd digit)

(Example of Resistor)


light brown (background color)
brown
red
yellow
1
2
10⁴ ➡ 12×10⁴ Ω= 120000Ω
= 120kΩ

(Example of Capacitor)

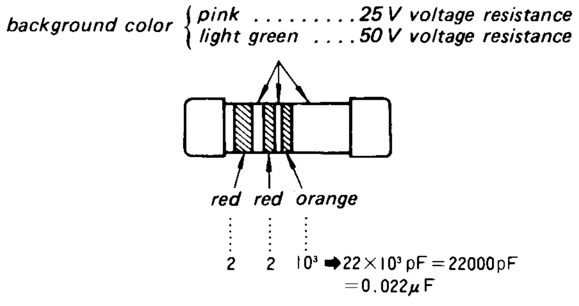

background color
pink ....25 V voltage resistance
light green ....50 V voltage resistance
red
red
orange
2
2
10³ ➡ 22×10³ pF = 22000pF
=0.022μF

Fig. 2

3. How to
Mount

Use a s
tip 4 mm i
angle showr

1. Bring
   equal
   compo
2. The s
   (The s
   amoun
   the iro
3. Once t
   aside
   remove

lodel
lodel

MELF (Metal Electrodes Face-Bonding) Components (AEP, E Model)

Warning

If MELF components are forcibly removed from the printed circuit board with pincers or pliers, the circuit board pattern is likely to peel away. Always remove MELF components according to the procedure described on the next page. Replace MELF components with the lead type components.

MELF components are soldered directly to the surface of the printed circuit board.

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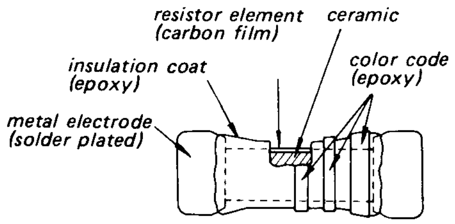
The MELF resistor color coding is the same as for conventional resistors, and MELF capacitor color coding is the same as for tube-type ceramic capacitors. Note, however, that all MELF resistors are rated at ¼W and ±5%.

Components larger than resistors and without a color code are cross conductors, which are used instead of jumper wires.

1. Structure

(Resistors)


resistor element
(carbon film)
ceramic
insulation coat
(epoxy)
color code
(epoxy)
metal electrode
(solder plated)

(Capacitors)

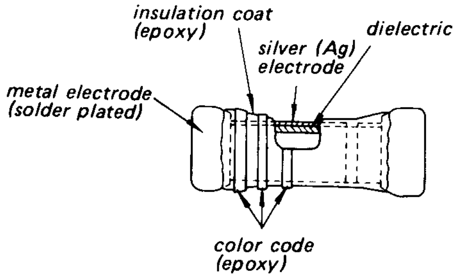
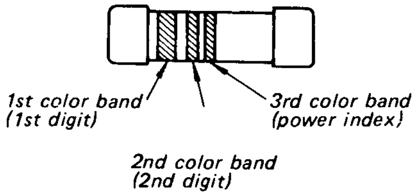
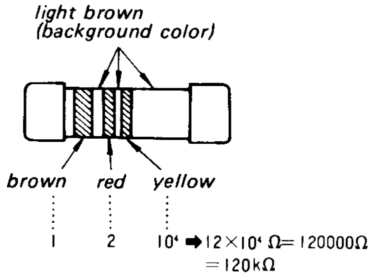

insulation coat
(epoxy)
dielectric
silver (Ag)
electrode
metal electrode
(solder plated)
color code
(epoxy)

Fig. 1

2. Color Code Reading


1st color band
(1st digit)
3rd color band
(power index)
2nd color band
(2nd digit)

(Example of Resistor)


light brown
(background color)
brown
red
yellow
1
2
10⁴ ➡12×10⁴ Ω=120000Ω
=120kΩ

(Example of Capacitor)

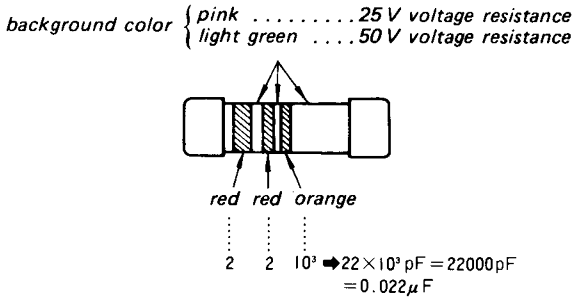

background color
pink ....25 V voltage resistance
light green ....50 V voltage resistance
red
red
orange
2
2
10³ ➡22×10³pF=22000pF
=0.022μF

Fig. 2

3. How to Remove MELF Components and Mount Replacements

Use a soldering iron of at least 40W with an iron tip 4mm in diameter and file the tip down to the angle shown in the diagram.

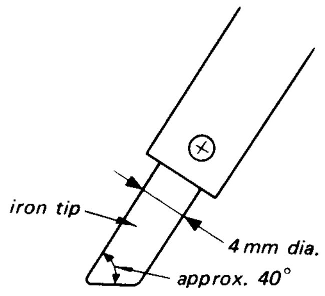

iron tip
4mm dia.
approx. 40°

Fig. 3

1. Bring the flat surface of the soldering iron in equal contact with both soldered ends of the component.
2. The solder should melt in about 4 seconds. (The solder will melt more readily if a small amount of solder is attached to the iron tip and the iron tip is placed against the component.)
3. Once the solder has melted, tap the component aside with the tip of the soldering iron, and remove it from the board.

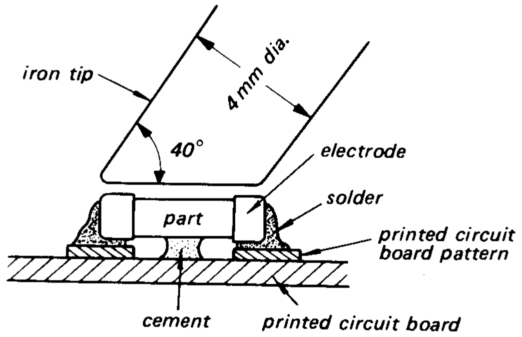

iron tip
4 mm dia.
40°
electrode
part
solder
printed circuit
board pattern
cement
printed circuit board

Fig. 4

4. Use lead type resistors or capacitors to replace the MELF components.
These replacements may be mounted either with short leads (see Fig. 5), or by covering a lead with tubing (see Fig. 6).

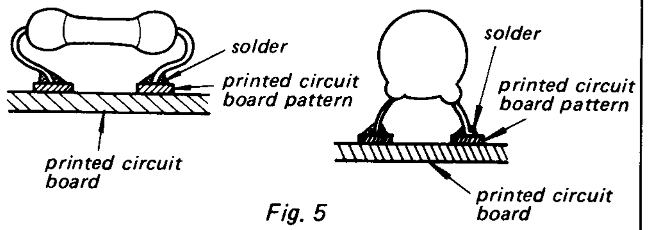

solder
printed circuit
board pattern
printed circuit
board
solder
printed circuit
board pattern
printed circuit
board

Fig. 5

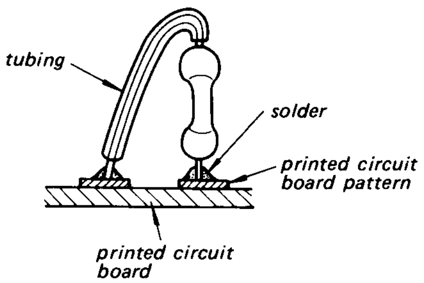
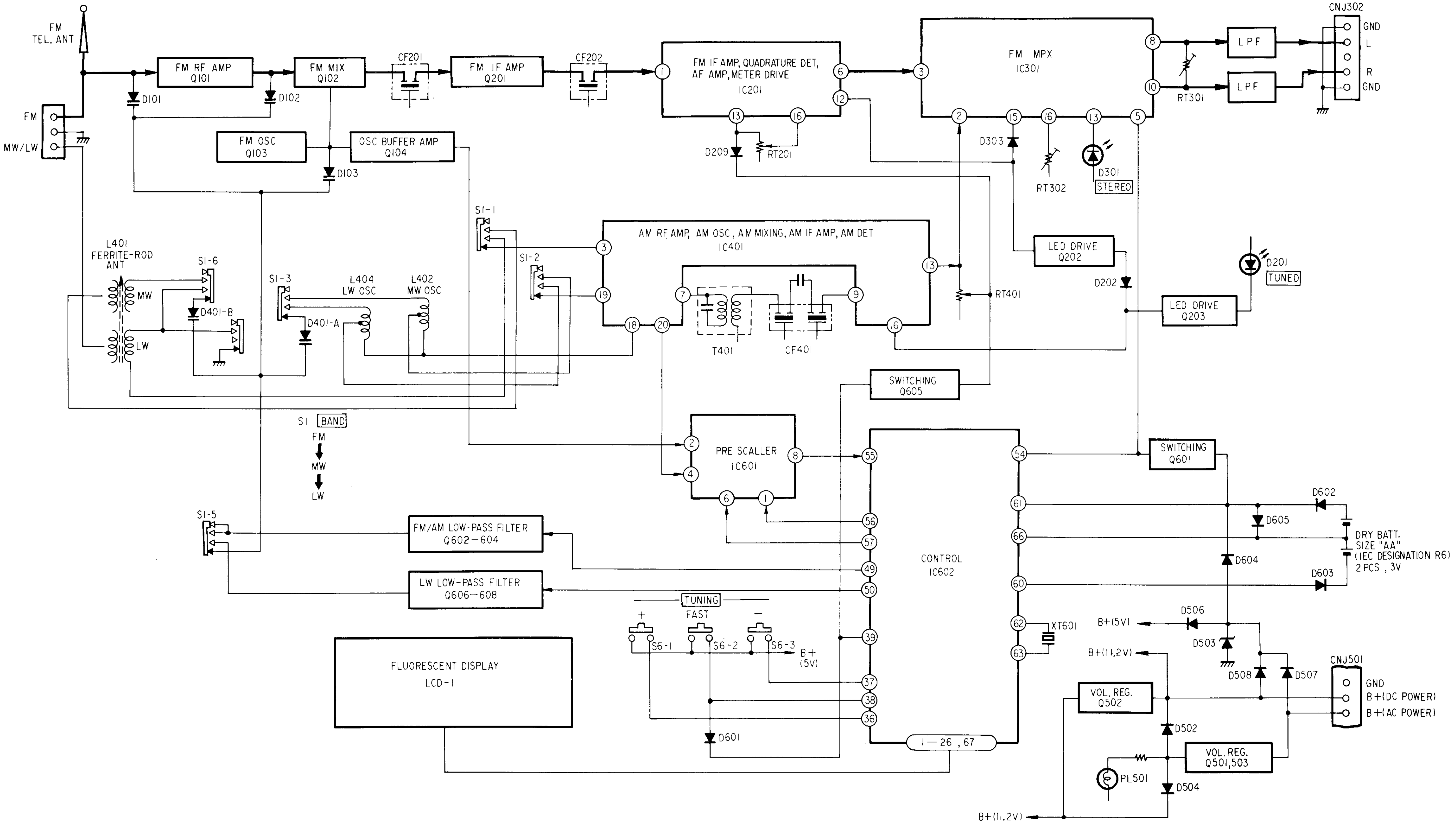

tubing
solder
printed circuit
board pattern
printed circuit
board

Fig. 6

SECTION 1
BLOCK DIAGRAM


FM TEL. ANT
FM
MW/LW
FM RF AMP Q101
D101
D102
FM MIX Q102
CF201
FM IF AMP Q201
CF202
FM IF AMP, QUADRATURE DET, AF AMP, METER DRIVE IC201
FM OSC Q103
OSC BUFFER AMP Q104
D103
D209
RT201
FM MPX IC301
D303
RT302
D301
STEREO
CNJ302
GND
L
R
GND
LPF
LPF
RT301
LED DRIVE Q202
D202
LED DRIVE Q203
D201
TUNED
S1-1
S1-2
AM RF AMP, AM OSC, AM MIXING, AM IF AMP, AM DET IC401
T401
CF401
RT401
L401 FERRITE-ROD ANT
MW
LW
S1-6
D401-B
S1-3
D401-A
L404 LW OSC
L402 MW OSC
S1 BAND
FM
MW
LW
SWITCHING Q605
PRE SCALLER IC601
CONTROL IC602
SWITCHING Q601
S1-5
FM/AM LOW-PASS FILTER Q602−604
LW LOW-PASS FILTER Q606−608
TUNING
+
FAST
−
S6-1
S6-2
S6-3
B+ (5V)
D601
FLUORESCENT DISPLAY LCD-1
1 − 26 , 67
D602
D605
D604
D603
DRY BATT. SIZE "AA" (IEC DESIGNATION R6) 2 PCS , 3V
XT601
B+(5V)
D506
D503
B+(11.2V)
D508
D507
CNJ501
GND
B+(DC POWER)
B+(AC POWER)
VOL. REG. Q502
D502
VOL. REG. Q501,503
PL501
D504
B+(11.2V)

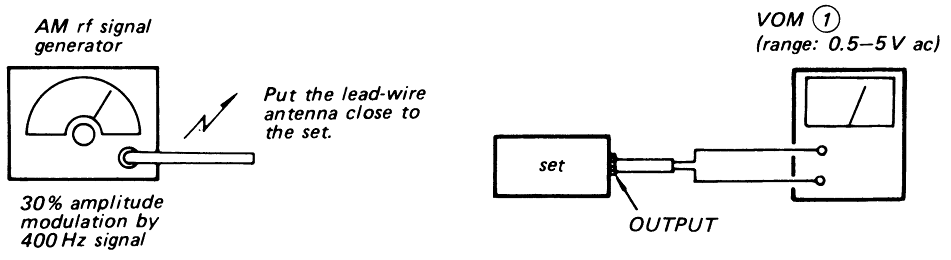
SECTION 2
ADJUSTMENTS

MW/LW SECTION

Setting:

Band Selector: MW/LW

Setup: after adjusting LW, adjust MW.

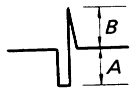

AM rf signal generator
Put the lead-wire antenna close to the set.
30% amplitude modulation by 400 Hz signal
VOM ①
(range: 0.5–5 V ac)
set
OUTPUT

- Repeat the procedures in each adjustment several times, and the frequency coverage and tracking adjustments should be finally done by the trimmer capacitors.

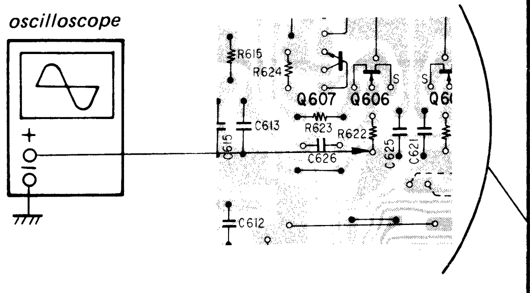
LW PLL Bias Adjustment

1. Connect the oscilloscope as shown on the right.
2. Set BAND selector switch (S1) to LW.
3. Push TUNING (+, –) button for 153kHz.
4. Adjust RT602 so that the waveform is shown below.

   A : B = 1 : 1
   A is approx. 0.7V

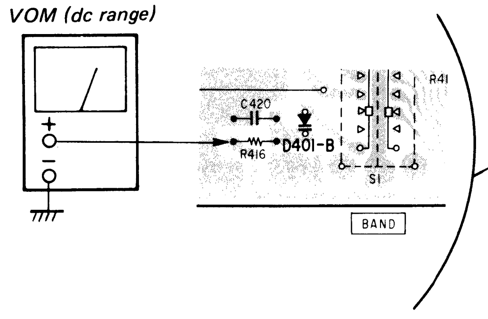
   

5. Confirm that the waveform is locked when the set is tuned to 344kHz.


oscilloscope
+
–
R615
R624
Q607
Q606
C613
R623
R622
C615
C626
C625
C621
C612
S

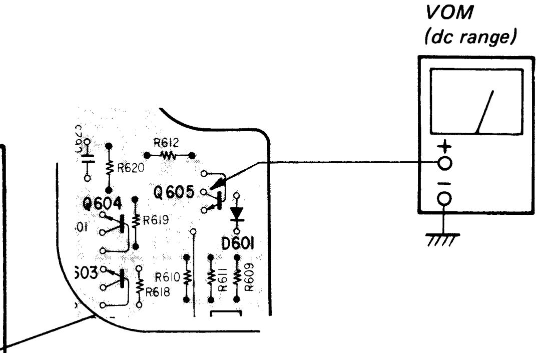
MW/LW OSC Voltage Adjustment

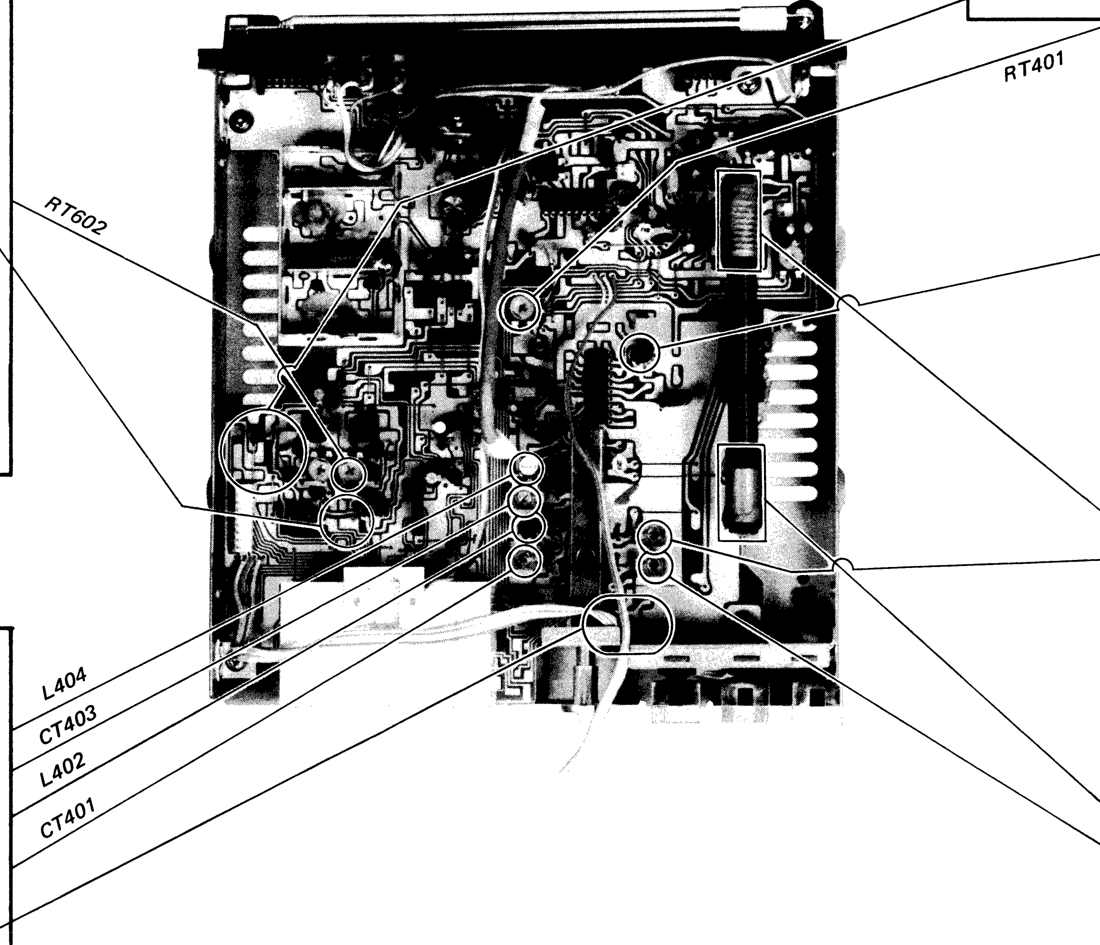
1. Set BAND selector switch (S1) to MW.
2. Push TUNING (+, –) button for 522kHz. Adjust L402 for 1.0 – 1.1V VOM reading.
3. Push the button for 1,602kHz. Adjust CT401 for 8.9 – 9.0V VOM reading.
4. Set BAND selector switch (S1) to LW.
5. Push TUNING (+, –) button for 153kHz. Adjust L404 for 1.0 – 1.1V VOM reading.
6. Push the button for 344kHz. Adjust CT-403 for 8.9 – 9.0V VOM reading.


VOM (dc range)
+
–
C420
R416
D401-B
R41
S1
BAND

MW Slow Speed Action Level Adjustment

1. Set BAND selector switch (S1) to MW. Confirm that the receiving condition is no signal.
2. Adjust RT401 so that the collector voltage of Q605 is 4.0 – 5.0V.


VOM
(dc range)
+
–
R612
R620
Q605
Q604
R619
D601
R610
R618
R611
R609


RT401
RT602
L404
CT403
L402
CT401

MW IF ADJUSTMENT	
Adjust for a maximum reading on VOM①.	
T401	450kHz

LW TRACKING ADJUSTMENT	
Adjust for a maximum reading on VOM①.	
L401	170kHz
CT404	310kHz

MW TRACKING ADJUSTMENT	
Adjust for a maximum reading on VOM①.	
L401	603kHz
CT402	1,404kHz

FM SECTION 1

Setting:

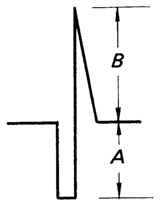
Band Selector: FM

FM rf Stereo Signal	FM rf Monaural Signal
Carrier frequency: 98MHz Modulation: Audio 400Hz, 16.25kHz deviation Subchannel 38kHz 16.25kHz deviation Pilot 19kHz 7.5kHz deviation	Carrier frequency: 98MHz Modulation: 1kHz, 40kHz deviation

FM/MW PLL Bias Adjustment

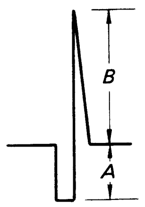
1. Connect the oscilloscope as shown on the right.
2. Set BAND selector switch (S1) to FM.
3. Push TUNING (+, –) button for 87.5MHz.
4. Adjust RT601 so that the waveform is shown below.

   A : B = 2.0 : more than 3.0
   A is approx. 0.4V

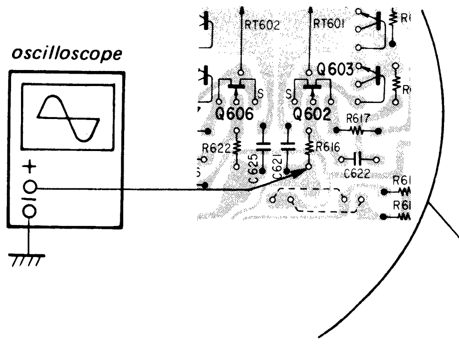


5. Push the button for 108MHz.
   Confirm that the waveform is locked as shown below.

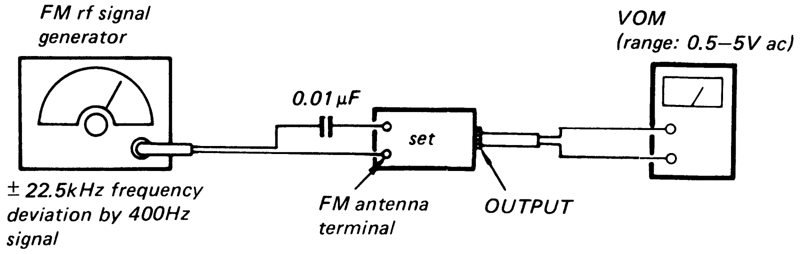
   A : B = 1.5 : 3.5
   A is approx. 0.3V



6. Set BAND selector switch (S1) to MW.
   Confirm that the waveform is locked when the set is tuned to 522kHz.
7. Confirm that the waveform is locked when the set is tuned to 1,602kHz.

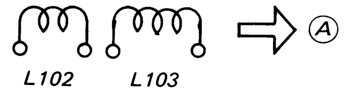

oscilloscope
RT602
RT601
Q603
Q606
Q602
R617
R622
R616
C625
C621
C622

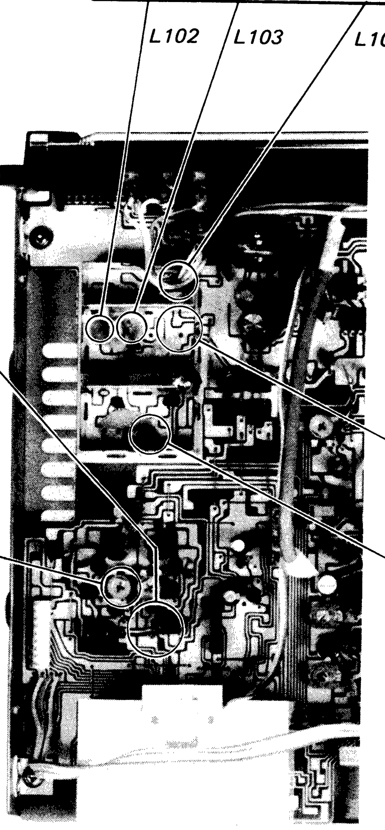
FM Tracking Adjustment


FM rf signal generator
0.01μF
set
VOM (range: 0.5–5V ac)
± 22.5kHz frequency deviation by 400Hz signal
FM antenna terminal
OUTPUT

1. Push TUNING (+, –) button for 98MHz.
2. Approach L102 and L103 not to contact each other.
3. Adjust L101 and L103, and repeat the adjustment 2 – 3 times for maximum VTVM reading.

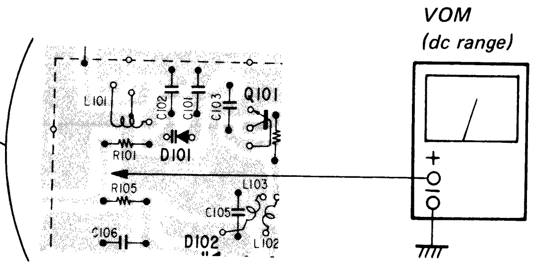
   (Adjust L103 in the direction as shown by arrow Ⓐ.)




L102
L103
L101
RT601
L105

FM OSC Voltage Adjustment

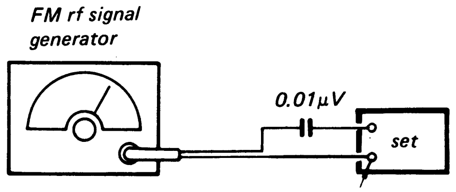
Push TUNING (+, –) button for 108MHz.
Adjust L105 for 8.9 – 9V VOM reading.


VOM (dc range)
L101
Q101
R101
D101
R105
L103
C105
C106
D102
L102

FM SECTION 2

TUNED Indicator Adjustment

Setting:


FM rf signal generator
0.01μV
set

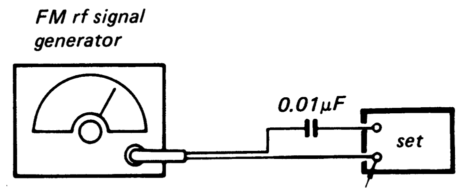
Modulation: no modulation
Output level: 25dB (75Ω terminal end output)
FM antenna terminal

Procedure:

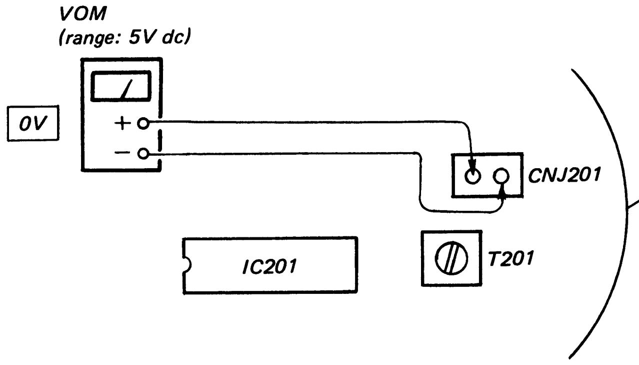
Adjust RT201 so that TUNED indicator (D201) lights up.

FM Discriminator Adjustment

Setting:


FM rf signal generator
0.01μF
set

Output level: 1mV (60dB)
FM antenna terminal

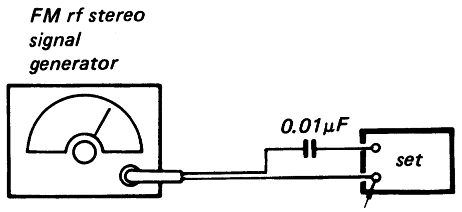

VOM
(range: 5V dc)
0V
+
−
CNJ201
IC201
T201

Procedure:

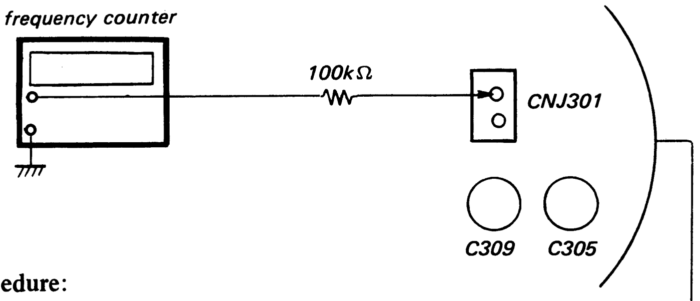
Push TUNING (+, −) button for 98MHz.
Adjust T201 for 0V VOM reading.

VCO Adjustment

Setting:

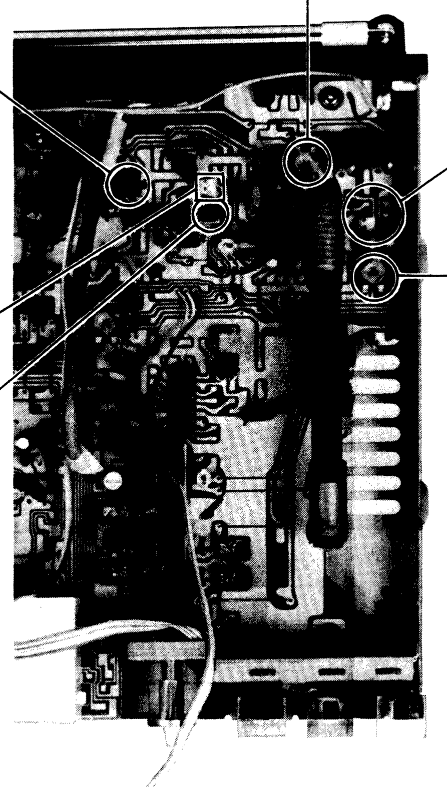

FM rf stereo signal generator
0.01μF
set

Output level: 1mV (60dB)
FM antenna terminal


frequency counter
100kΩ
CNJ301
C309
C305

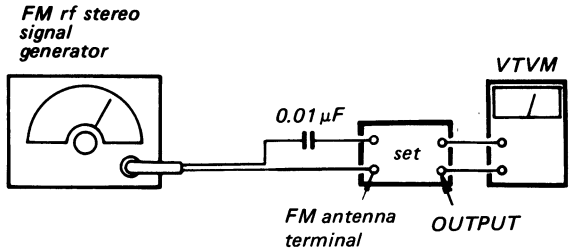
Procedure:

Adjust RT302 so that the frequency counter indicates 19kHz ±50Hz.


RT201
RT302
T201
RT301

FM Stereo Separation Adjustment

Procedure:


FM rf stereo signal generator
VTVM
0.01μF
set
FM antenna terminal
OUTPUT

Carrier frequency: 98MHz
Output level: 1mV (60dB)
Modulation:
Audio (400Hz): 16.25kHz deviation
Pilot (19kHz): 7.5kHz deviation
Sub-channel: 16.25kHz deviation

FM stereo signal generator output channel	VTVM connection	VTVM reading (dB)
L-CH	L-CH	Ⓐ
R-CH	L-CH	Ⓑ Adjust RT301 for minimum reading.
R-CH	R-CH	Ⓒ
L-CH	R-CH	Ⓓ Adjust RT301 for minimum reading.

L-CH Stereo separation: Ⓐ − Ⓑ
R-CH Stereo separation: Ⓒ − Ⓓ

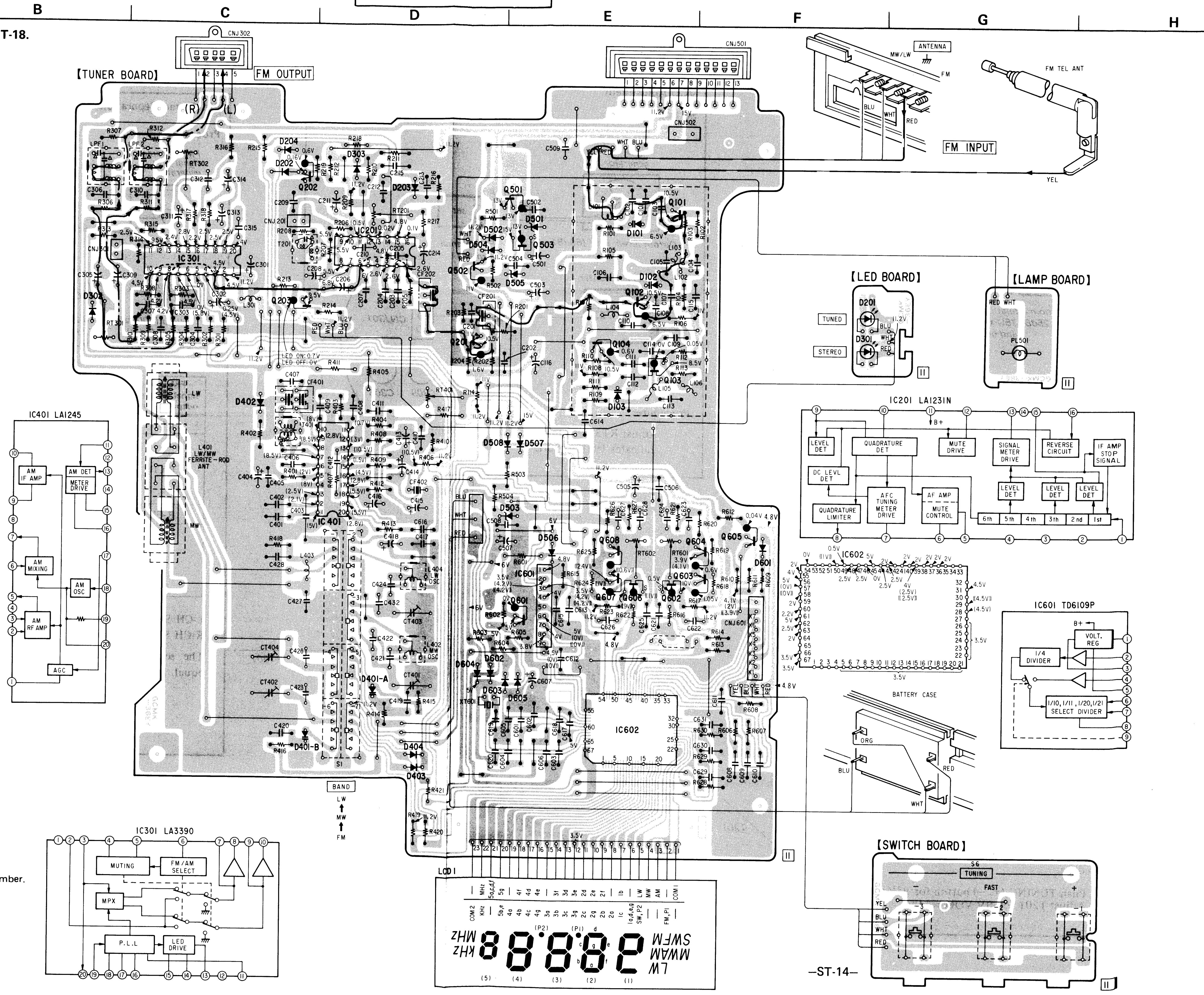
The separations of both channels should be equal.

SECTION 3
DIAGRAMS

3-1. MOUNTING DIAGRAM

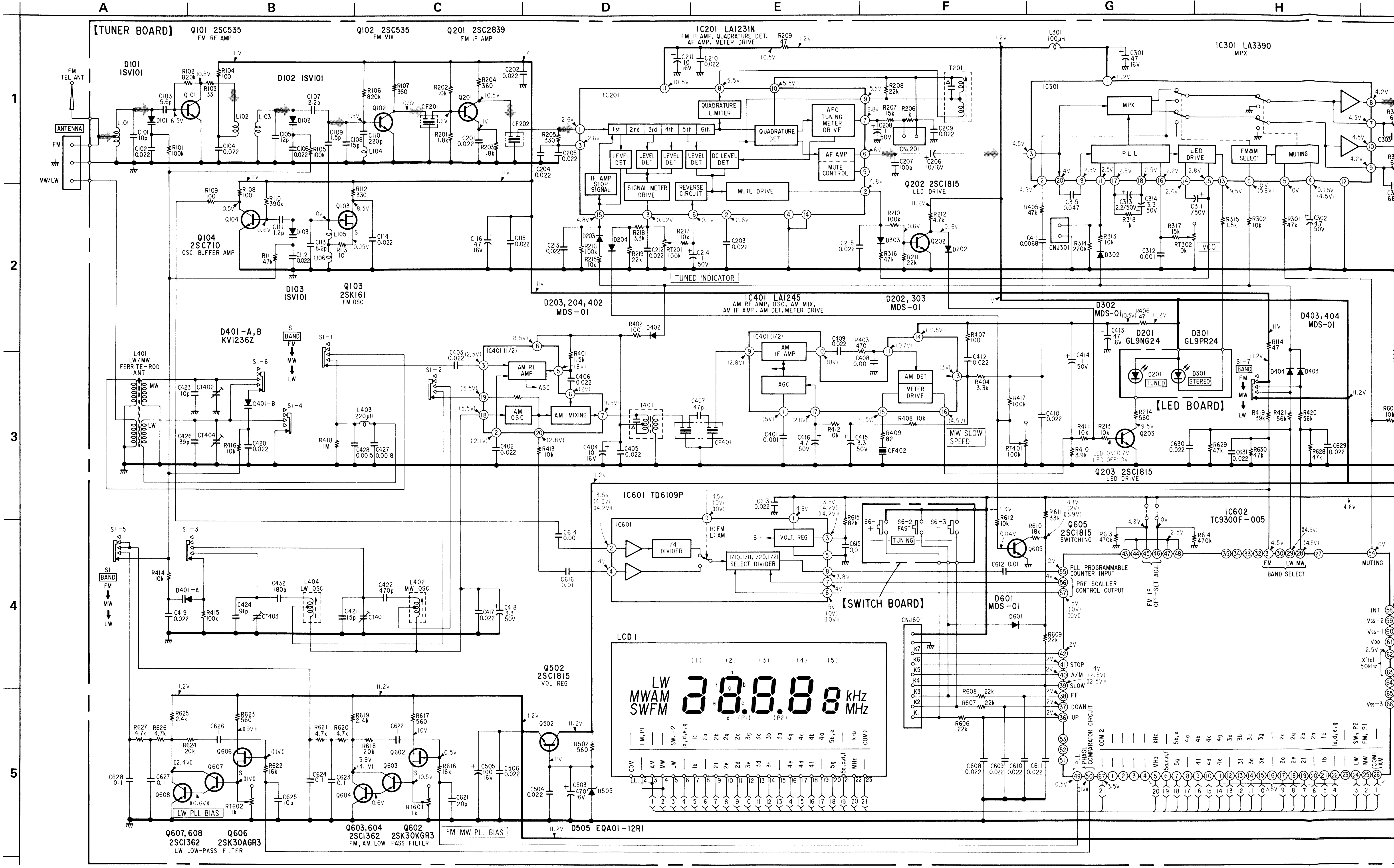
Semiconductor Lead Layouts : See Page ST-18.

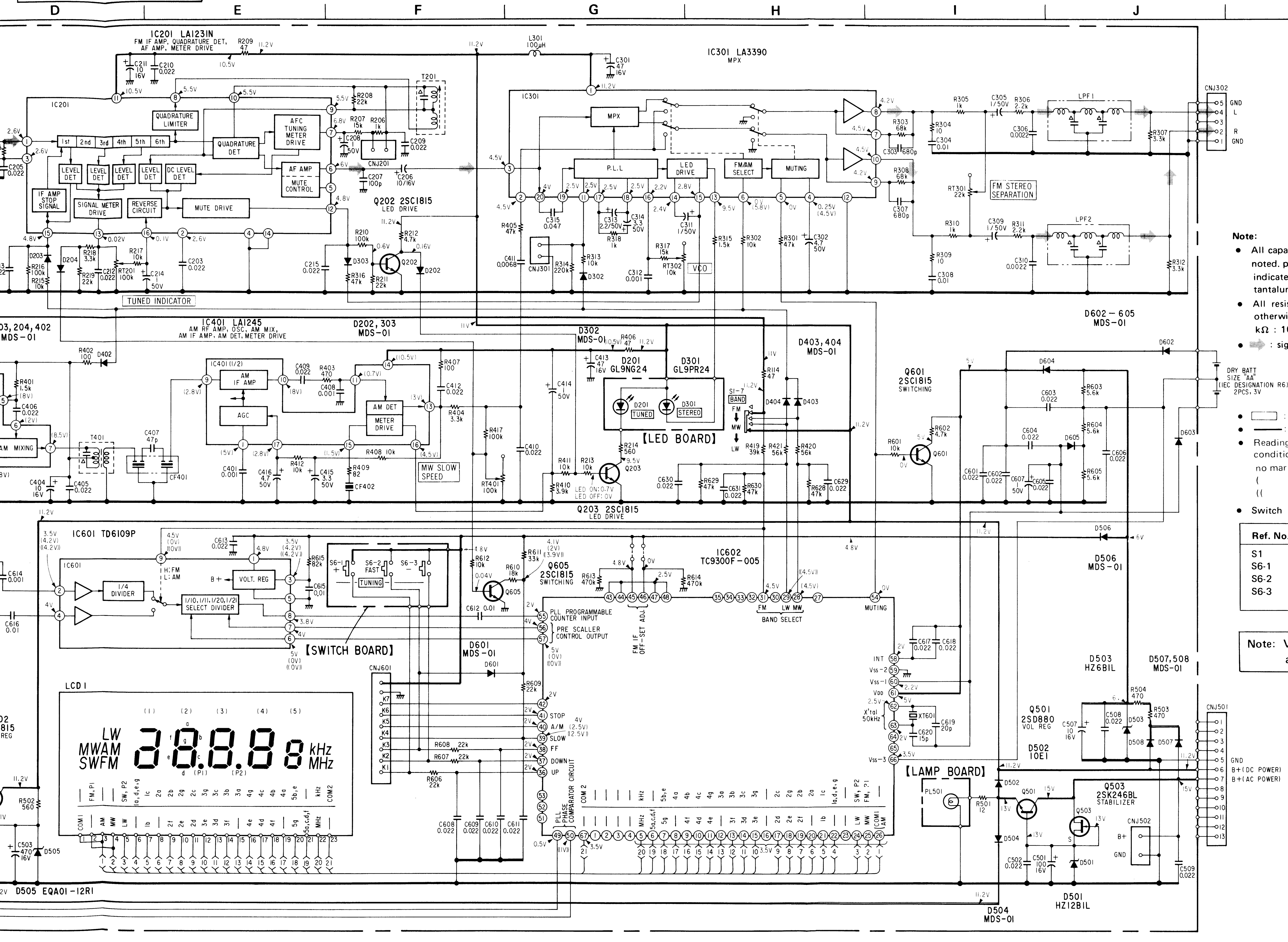
Q , IC	D
	204
	303
202	202
	203
501	
101	
	501,101
	502
503	
	504
IC201	
IC301 502	
	505
	102
	201
203 102	
	302
	301
201,104	
103	
	103
	402
	508,507
IC401	
	503
605	
608,604	506 601
607,603	
606,602	
IC601	
601	
	604,602
	603,605
	401-A
IC602	
	401-B
	404
	403
Q , IC	D


A
B
C
D
E
F
G
H
1
2
3
4
5
CNJ302
【TUNER BOARD】
FM OUTPUT
(R)
(L)
CNJ501
CNJ502
ANTENNA
MW/LW
FM
BLU
WHT
RED
FM INPUT
FM TEL ANT
YEL
【LED BOARD】
TUNED
STEREO
D201
D301
【LAMP BOARD】
PL501
IC201 LA1231N
LEVEL DET
QUADRATURE DET
MUTE DRIVE
SIGNAL METER DRIVE
REVERSE CIRCUIT
IF AMP STOP SIGNAL
DC LEVL DET
AFC TUNING METER DRIVE
AF AMP
MUTE CONTROL
QUADRATURE LIMITER
6th
5th
4th
3rd
2nd
1st
IC401 LA1245
AM IF AMP
AM DET
METER DRIVE
AM MIXING
AM OSC
AM RF AMP
AGC
L401 LW/MW FERRITE-ROD ANT
LW
MW
IC301
IC401
S1
BAND
LW
MW
FM
IC602
IC601 TD6109P
B+
VOLT. REG
1/4 DIVIDER
1/10, 1/11, 1/20, 1/21 SELECT DIVIDER
BATTERY CASE
ORG
LCD1
KHz
MHz
LW
MWAM
SWFM
(P2)
(P1)
(5)
(4)
(3)
(2)
(1)
IC301 LA3390
MUTING
FM/AM SELECT
MPX
P.L.L
LED DRIVE
【SWITCH BOARD】
S6
TUNING
FAST

Note:
- [ ]← : indicates side identified with part number.
- ▨ : B+ pattern
- ━━▶━━ : signal path
- ━ ━ ━▶ : L-CH signal path
- ━·━·━▶ : R-CH signal path

3-2. SCHEMATIC DIAGRAM


A
B
C
D
E
F
G
H
1
2
3
4
5
【TUNER BOARD】
Q101 2SC535 FM RF AMP
Q102 2SC535 FM MIX
Q201 2SC2839 FM IF AMP
IC201 LA1231N FM IF AMP, QUADRATURE DET, AF AMP, METER DRIVE
IC301 LA3390 MPX
D101 1SV101
D102 1SV101
D103 1SV101
Q103 2SK161 FM OSC
Q104 2SC710 OSC BUFFER AMP
FM TEL ANT
ANTENNA
FM
MW/LW
QUADRATURE LIMITER
QUADRATURE DET
AFC TUNING METER DRIVE
AF AMP
MUTE CONTROL
LEVEL DET
DC LEVEL DET
IF AMP STOP SIGNAL
SIGNAL METER DRIVE
REVERSE CIRCUIT
MUTE DRIVE
TUNED INDICATOR
Q202 2SC1815 LED DRIVE
MPX
P.L.L
LED DRIVE
FM/AM SELECT
MUTING
VCO
D203, 204, 402 MDS-01
IC401 LA1245 AM RF AMP, OSC, AM MIX, AM IF AMP, AM DET, METER DRIVE
D202, 303 MDS-01
D302 MDS-01
D201 GL9NG24
D301 GL9PR24
D403, 404 MDS-01
D401-A, B KV1236Z
L401 LW/MW FERRITE-ROD ANT
S1 BAND FM MW LW
AM RF AMP
AM OSC
AM MIXING
AM IF AMP
AGC
AM DET
METER DRIVE
MW SLOW SPEED
TUNED
STEREO
【LED BOARD】
Q203 2SC1815 LED DRIVE
IC601 TD6109P
1/4 DIVIDER
VOLT. REG
1/10, 1/11, 1/20, 1/21 SELECT DIVIDER
H: FM L: AM
TUNING
【SWITCH BOARD】
Q605 2SC1815 SWITCHING
IC602 TC9300F-005
PLL PROGRAMMABLE COUNTER INPUT
PRE SCALLER CONTROL OUTPUT
FM IF OFF-SET ADJ
BAND SELECT
MUTING
D601 MDS-01
CNJ601
STOP
A/M
SLOW
FF
DOWN
UP
X'tal 50kHz
PLL PHASE COMPARATOR CIRCUIT
L404 LW OSC
L402 MW OSC
LCD1
LW MWAM SWFM
kHz MHz
Q502 2SC1815 VOL REG
LW PLL BIAS
FM MW PLL BIAS
Q607, 608 2SC1362
Q606 2SK30AGR3
LW LOW-PASS FILTER
Q603, 604 2SC1362
Q602 2SK30KGR3
FM, AM LOW-PASS FILTER
D505 EQA01-12R1


D
E
F
G
H
I
J
K
1
2
3
4
5
IC201 LA1231N
FM IF AMP, QUADRATURE DET, AF AMP, METER DRIVE
QUADRATURE LIMITER
AFC TUNING METER DRIVE
QUADRATURE DET
AF AMP
MUTE CONTROL
LEVEL DET
DC LEVEL DET
IF AMP STOP SIGNAL
SIGNAL METER DRIVE
REVERSE CIRCUIT
MUTE DRIVE
TUNED INDICATOR
Q202 2SC1815
LED DRIVE
CNJ201
T201
L301 100μH
IC301 LA3390
MPX
P.L.L
LED DRIVE
FM/AM SELECT
MUTING
FM STEREO SEPARATION
LPF1
LPF2
CNJ302
GND
L
R
GND
CNJ301
VCO
D202,303 MDS-01
D203,204,402 MDS-01
IC401 LA1245
AM RF AMP, OSC, AM MIX, AM IF AMP, AM DET, METER DRIVE
AM IF AMP
AGC
AM DET
METER DRIVE
AM MIXING
T401
CF401
CF402
MW SLOW SPEED
D302 MDS-01
D201 GL9NG24
D301 GL9PR24
TUNED
STEREO
【LED BOARD】
Q203 2SC1815
LED DRIVE
LED ON: 0.7V
LED OFF: 0V
D403,404 MDS-01
S1-7 BAND
FM
MW
LW
Q601 2SC1815
SWITCHING
D602－605 MDS-01
DRY BATT SIZE "AA" (IEC DESIGNATION R6) 2PCS, 3V
IC601 TD6109P
1/4 DIVIDER
VOLT. REG
H: FM L: AM
1/10, 1/11, 1/20, 1/21 SELECT DIVIDER
【SWITCH BOARD】
TUNING
FAST
Q605 2SC1815
SWITCHING
IC602 TC9300F-005
PLL PROGRAMMABLE COUNTER INPUT
PRE SCALLER CONTROL OUTPUT
FM IF OFF-SET ADJ
BAND SELECT
MUTING
D601 MDS-01
CNJ601
LCD1
LW MWAM SWFM
kHz MHz
STOP
A/M
SLOW
FF
DOWN
UP
PLL PHASE COMPARATOR CIRCUIT
D505 EQA01-12R1
D506 MDS-01
D503 HZ6B1L
D507,508 MDS-01
Q501 2SD880
VOL REG
D502 10E1
【LAMP BOARD】
PL501
Q503 2SK246BL
STABILIZER
CNJ502
B+
GND
D501 HZ12B1L
D504 MDS-01
CNJ501
GND
B+(DC POWER)
B+(AC POWER)

Note:

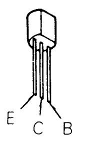
- All capacitors are in μF unless otherwise noted. pF : μμF 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in ohms, ¼W unless otherwise noted.
  kΩ : 1000Ω, MΩ : 1000kΩ
- ➡ : signal path
- ▭ : adjustment for repair.
- —— : B+ bus.
- Reading are taken under no-signal conditions.
  no mark : FM
  ( ) : MW
  (( )) : LW
- Switch

Ref. No.	Switch		Position
S1	BAND		FM
S6-1	+	TUNING	OFF
S6-2	FAST		OFF
S6-3	−		OFF

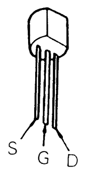
Note: Voltages are measured with a VOM (50kΩ/V).

- **Semiconductor Lead Layouts**

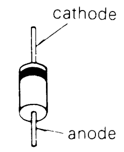
2SC535
2SC1362
2SC1364



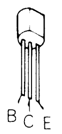
2SK30A-GR3
2SK246-BL



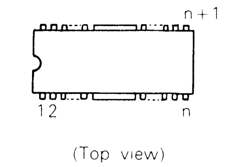
1S1555
10E2
EQA01-12R1
HZ6B1L
HZ12B1L


cathode
anode

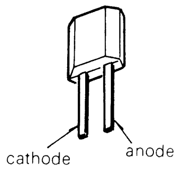
2SC710-14



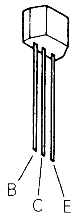
LA1231
LA1245
LA3390


n+1
1
2
n
(Top view)

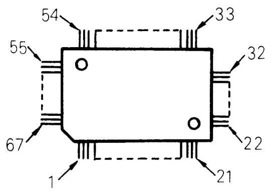
1SV101


cathode
anode

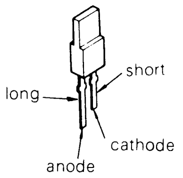
2SC2839



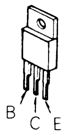
TC9300F-005


54
33
55
32
67
22
1
21

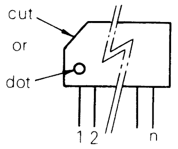
GL-9NG24
GL-9PR24


short
long
cathode
anode

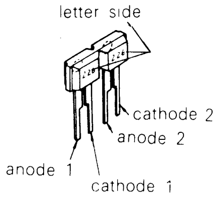
2SD880



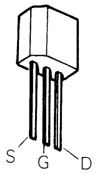
TD6109P


cut
or
dot
1
2
n

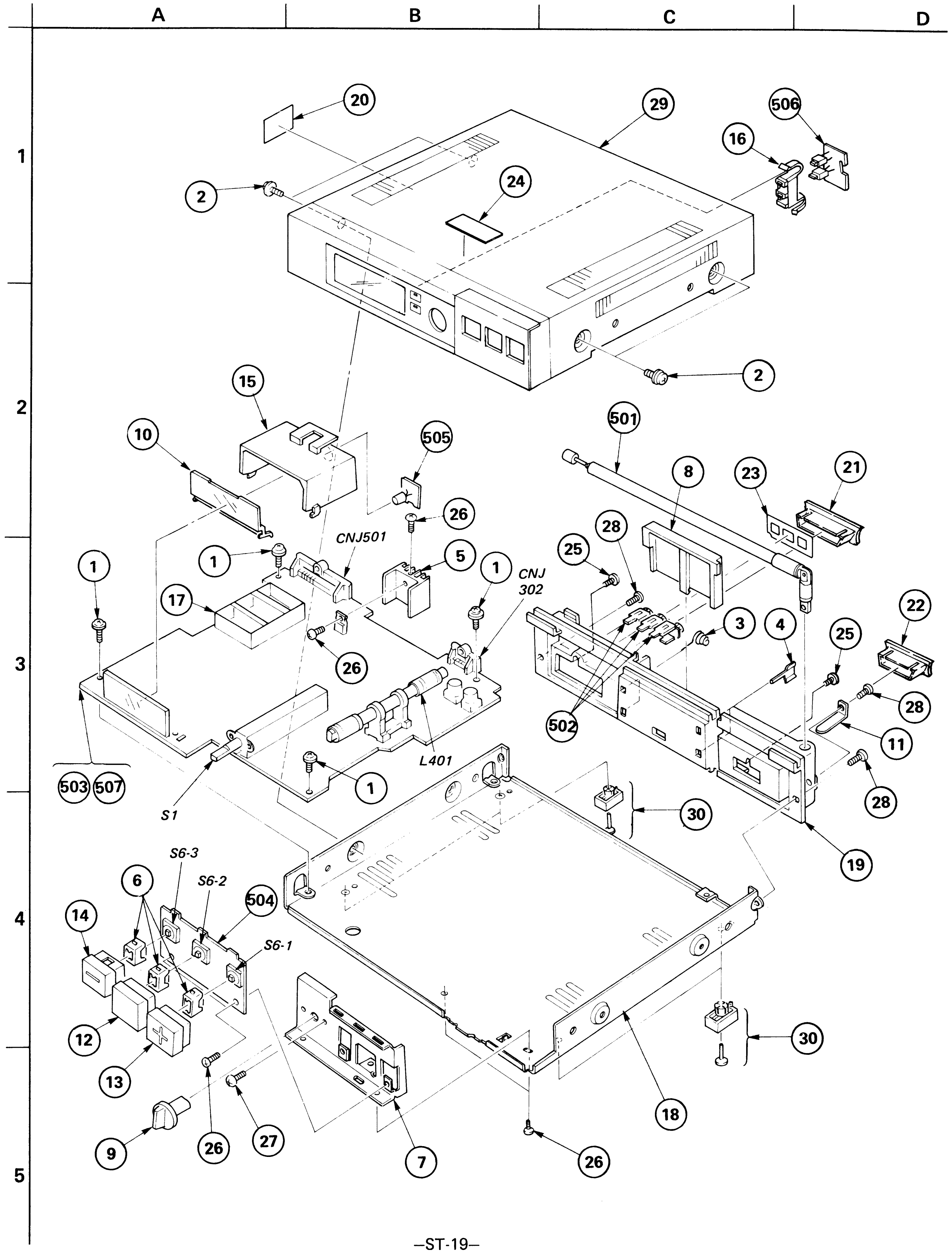
KV1236Z2


letter side
cathode 2
anode 2
anode 1
cathode 1

2SK161



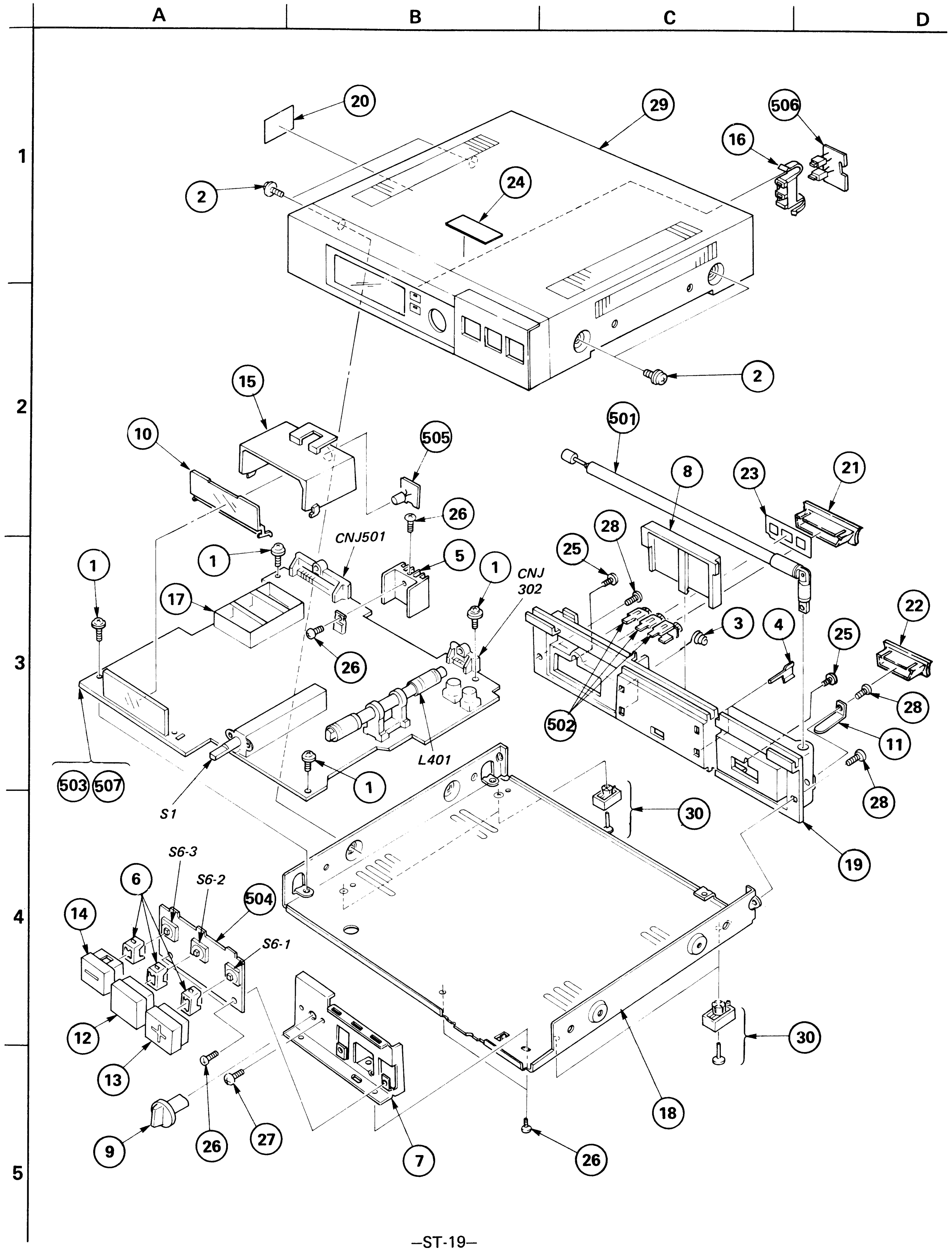
SECTION 4
EXPLODED VIEW AND PARTS LIST


A
B
C
D
1
2
3
4
5
20
29
506
16
2
24
2
15
501
10
505
8
23
21
26
28
1
CNJ501
5
1
CNJ 302
25
1
17
3
4
22
25
26
28
502
11
L401
1
28
503
507
S1
30
19
6
S6-3
S6-2
504
14
S6-1
12
13
30
9
26
27
7
18
26

No.	Part
1	3-701
2	3-703
2	3-703
3	3-883
4	3-883
5	♠;4-863
6	4-881
7	♠;4-884
8	4-884
9	4-884
10	4-884
11	♠;4-884
12	4-884
13	4-884
14	4-884
15	♠;4-884
16	4-884
17	♠;4-884
18	♠;4-884
19	4-884
19	4-884
20	4-884
20	4-884
21	4-884
22	4-884
23	4-884
23	4-884
24	4-884
25	7-685
26	7-685
27	7-685
28	7-685
29	A-432
30	X-488

NOTE:
- Items with no
cription are
are seldom re
- Items marked
thev are seld
service. Som
pated when or
- Due to standa
numbers (Δ-ΔΔ
may be differ
set.

SECTION 4
EXPLODED VIEW AND PARTS LIST



GENERAL SECTION

No.	Part No.	Description
1	3-701-589-00	SCREW, SELF-TAPPING
2	3-703-354-11	(AEP-Germany)...SCREW, CASE, CLAW
2	3-703-668-00	(AEP.UK)........SCREW, CASE
3	3-883-424-00	SPRING
4	3-883-428-00	PLATE, TERMINAL (POSITIVE)
5	♠;4-863-132-00	HEAT SINK (SMALL)
6	4-881-725-00	RING (TACT), FLEXIBLE
7	♠;4-884-844-00	CHASSIS, SUB
8	4-884-845-00	LID, BATTERY CASE
9	4-884-847-00	KNOB, ROTARY SWITCH
10	4-884-848-00	ILLUMINATOR
11	♠;4-884-850-00	LUG, ANTENNA
12	4-884-852-00	KNOB (16X16), SQUARE (FAST)
13	4-884-853-00	KNOB (16X16), SQUARE (+)
14	4-884-854-00	KNOB (16X16), SQUARE (-)
15	♠;4-884-856-00	HOUSE, LAMP
16	4-884-857-00	HOLDER, LED
17	♠;4-884-858-00	PLATE, SHIELD
18	♠;4-884-859-00	CHASSIS
19	4-884-860-01	(AEP-Germany)...PLATE, JACK
19	4-884-860-11	(AEP.UK)........PLATE, JACK
20	4-884-871-00	(AEP.UK)........LABEL, MODEL NUMBER
20	4-884-929-00	(AEP-Germany)...LABEL, MODEL NUMBER
21	4-884-874-00	COVER, CONNECTOR (A)
22	4-884-876-00	COVER, CONNECTOR (B)
23	4-884-916-00	(AEP.UK)........LABEL, ANTENNA
23	4-884-917-00	(AEP-Germany)...LABEL, ANTENNA
24	4-884-927-00	LABEL (SYSTEM), CAUTION
25	7-685-547-19	SCREW +BTP 3X10 TYPE2 N-S
26	7-685-871-01	SCREW +BVTT 3X6 (S)
27	7-685-871-09	SCREW +BVTT 3X6 (S)
28	7-685-872-09	SCREW +BVTT 3X8 (S)
29	A-4322-460-A	CASE ASSY, PANEL
30	X-4884-801-0	FOOT ASSY, RUBBER

ELECTRICAL PARTS

Ref.No.	Part No.	Description			
501	1-501-270-00	ANTENNA, TELESCOPIC			
502	1-536-742-00	TERMINAL BOARD, ANTENNA			
503	♠;1-608-554-00	PC BOARD, TUNER			
504	♠;1-608-555-00	PC BOARD, SWITCH			
505	♠;1-608-556-00	PC BOARD, LAMP			
506	♠;1-608-557-00	PC BOARD, LED			
507	♠;A-4351-323-A	MOUNTED PCB, TUNER			
C421	1-102-880-00	CERAMIC	15PF	5%	50V
C423	1-101-999-00	CERAMIC	10PF	0.5PF	50V
C424	1-102-733-00	CERAMIC	91PF	5%	50V
C426	1-102-726-00	CERAMIC	39PF	5%	50V
CF201	1-527-968-71	FILTER, CERAMIC			
CF202	1-527-968-71	FILTER, CERAMIC			
CF401	1-527-937-00	FILTER, CERAMIC			
CF402	1-527-981-00	FILTER, CERAMIC			
♠CNJ201	;1-560-060-00	PIN, CONNECTOR 2P			
♠CNJ301	;1-560-060-00	PIN, CONNECTOR 2P			
CNJ302	1-562-067-00	SOCKET, CONNECTOR 5P			
CNJ501	1-562-068-00	SOCKET, CONNECTOR 13P			
♠CNJ502	;1-535-115-00	TERMINAL			
♠CNJ601	;1-560-339-00	PIN, CONNECTOR 9P			
♠CNJ602	;1-535-116-00	TERMINAL			
CT401	1-141-180-00	CAP, TRIMMER 15P			
CT402	1-141-180-00	CAP, TRIMMER 15P			
CT403	1-141-171-00	CAP, TRIMMER 20P			
CT404	1-141-171-00	CAP, TRIMMER 20P			
D101	8-719-800-09	DIODE 1SV101			
D102	8-719-800-09	DIODE 1SV101			
D103	8-719-800-09	DIODE 1SV101			
D201	8-719-903-07	DIODE GL-9NG24			
D202	8-719-815-55	DIODE 1S1555			
D203	8-719-815-55	DIODE 1S1555			
D204	8-719-815-55	DIODE 1S1555			
D301	8-719-903-11	DIODE GL-9PR24			
D302	8-719-815-55	DIODE 1S1555			
D303	8-719-815-55	DIODE 1S1555			
D401	8-719-902-79	DIODE KV1236Z2			
D402	8-719-815-55	DIODE 1S1555			
D403	8-719-815-55	DIODE 1S1555			
D404	8-719-815-55	DIODE 1S1555			
D501	8-719-910-24	DIODE HZ12B1L			
D502	8-719-200-02	DIODE 10E2			
D503	8-719-910-64	DIODE HZ6B1L			
D504	8-719-815-55	DIODE 1S1555			
D505	8-719-991-21	DIODE EQA01-12R1			
D506	8-719-815-55	DIODE 1S1555			
D507	8-719-815-55	DIODE 1S1555			

NOTE:
- Items with no part number and no description are not stocked because they are seldom required for routine service.
- Items marked " ♠ " are not stocked since thev are seldom required for routine service. Some delay should be anticipated when ordering these items.
- Due to standardization, parts with part numbers (Δ-ΔΔΔ-ΔΔΔ-XX or Δ-ΔΔΔΔ-ΔΔΔ-X) may be different from those used in the set.

CAPACITORS:
- All capacitors are in µF. Common capacitors are omitted. Refer to the following lists for their part numbers. MF:µF, PF:µµF.

RESISTORS
- All resistors are in ohms. Common 1/4W, 1/8W and 1/16W carbon resistors are omitted. Refer to the following lists for their part numbers.
- F : nonflammable

COILS
- MMH : mH, UH : µH

SEMICONDUCTORS
In each case, U : µ, for example:
UA···: µA···, UPA···: µPA···, UPC···: µPC,
UPD···: µPD···

ELECTRICAL PARTS

Ref.No.	Part No.	Description
D508	8-719-815-55	DIODE 1S1555
D601	8-719-815-55	DIODE 1S1555
D602	8-719-815-55	DIODE 1S1555
D603	8-719-815-55	DIODE 1S1555
D604	8-719-815-55	DIODE 1S1555
D605	8-719-815-55	DIODE 1S1555
IC201	8-759-812-31	IC LA1231
IC301	8-759-833-90	IC LA3390
IC401	8-759-812-45	IC LA1245
IC601	8-759-201-03	IC TD6109P
IC602	8-759-201-02	IC TC9300F-005
L101	🌢;1-422-093-00	COIL, AIR-CORE
L102	🌢;1-422-094-00	COIL, AIR-CORE
L103	🌢;1-422-096-00	COIL, AIR-CORE
L104	🌢;1-422-039-00	COIL, AIR-CORE
L105	🌢;1-422-098-00	COIL, AIR-CORE
L106	🌢;1-422-099-00	COIL, AIR-CORE
L301	1-408-421-21	MICRO INDUCTOR 100UH
L401	1-402-002-00	ANTENNA, FERRITE-ROD (LW/MW)
L402	1-406-033-00	COIL (OSC)
L403	1-408-425-21	MICRO INDUCTOR 220UH
L404	1-406-034-00	COIL (OSC)
LCD1	1-806-544-00	DISPLAY PANEL, LIQUID CRYSTAL
LPF1	1-235-164-00	FILTER, LOW PASS
LPF2	1-235-164-00	FILTER, LOW PASS
PL501	1-518-511-00	LAMP, PILOT
Q101	8-729-353-52	TRANSISTOR 2SC535
Q102	8-729-353-52	TRANSISTOR 2SC535
Q103	8-729-216-13	TRANSISTOR 2SK161
Q104	8-729-671-14	TRANSISTOR 2SC710-14
Q201	8-729-883-92	TRANSISTOR 2SC2839
Q202	8-729-663-47	TRANSISTOR 2SC1364
Q203	8-729-663-47	TRANSISTOR 2SC1364
Q501	8-729-288-02	TRANSISTOR 2SD880
Q502	8-729-663-47	TRANSISTOR 2SC1364
Q503	8-729-224-63	TRANSISTOR 2SK246-BL
Q601	8-729-663-47	TRANSISTOR 2SC1364
Q602	8-729-203-05	TRANSISTOR 2SK30A-GR3
Q603	8-729-665-47	TRANSISTOR 2SC1362
Q604	8-729-665-47	TRANSISTOR 2SC1362
Q605	8-729-663-47	TRANSISTOR 2SC1364
Q606	8-729-203-05	TRANSISTOR 2SK30A-GR3
Q607	8-729-665-47	TRANSISTOR 2SC1362
Q608	8-729-665-47	TRANSISTOR 2SC1362

ELECTRICAL PARTS

Ref.No.	Part No.	Description
RT201	1-226-854-41	RES, ADJ, CARBON 100K
RT301	1-226-852-41	RES, ADJ, CARBON 22K
RT302	1-228-505-00	RES, ADJ, CARBON 10K
RT401	1-226-854-41	RES, ADJ, CARBON 100K
RT601	1-226-663-00	RES, ADJ, CARBON 1K
RT602	1-226-663-00	RES, ADJ, CARBON 1K
S1	1-554-266-00	SWITCH, ROTARY SLIDE
S6-1	1-552-412-00	SWITCH, KEY BOARD
S6-2	1-552-412-00	SWITCH, KEY BOARD
S6-3	1-552-412-00	SWITCH, KEY BOARD
T201	1-404-419-00	COIL, DISCRIMINATOR
T401	1-404-413-00	TRANSFORMER, IF
XT601	1-527-995-00	VIBRATOR, CRYSTAL

NOTE:

- Items with no part number and no description are not stocked because they are seldom required for routine service.
- Items marked " 🌢 " are not stocked since thev are seldom required for routine service. Some delay should be anticipated when ordering these items.
- Due to standardization, parts with part numbers (Δ-ΔΔΔ-ΔΔΔ-XX or Δ-ΔΔΔΔ-ΔΔΔ-X) may be different from those used in the set.

CAPACITORS:

- All capacitors are in μF. Common capacitors are omitted. Refer to the following lists for their part numbers. MF:μF, PF:μμF.

RESISTORS

- All resistors are in ohms. Common 1/4W, 1/8W and 1/16W carbon resistors are omitted. Refer to the following lists for their part numbers.
- F : nonflammable

COILS

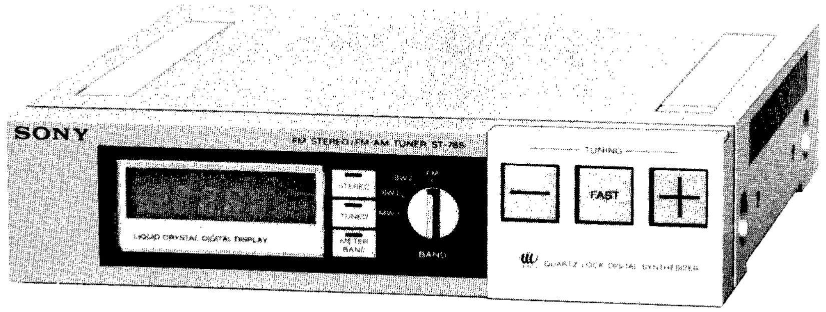
- MMH : mH, UH : μH

SEMICONDUCTORS

In each case, U : μ, for example:
UA···: μA···, UPA···: μPA···, UPC···: μPC, UPD···: μPD···

FM STEREO/FM-AM TUNER
〔ST-78S〕

E Model


SONY
FM STEREO/FM-AM TUNER ST-78S
TUNING
FAST
LIQUID CRYSTAL DIGITAL DISPLAY
STEREO
TUNED
METER
BAND
SW2
SW1
MW
FM
BAND
QUARTZ LOCK DIGITAL SYNTHESIZER

Note: ST-78S is an FM stereo/FM-AM tuner in FH-7.

MELF (Metal Electrodes Face-Bonding) Components (AEP, E Model)

Warning

If MELF components are forcibly removed from the printed circuit board with pincers or pliers, the circuit board pattern is likely to peel away. Always remove MELF components according to the procedure described on the next page. Replace MELF components with the lead type components.

MELF components are soldered directly to the surface of the printed circuit board.

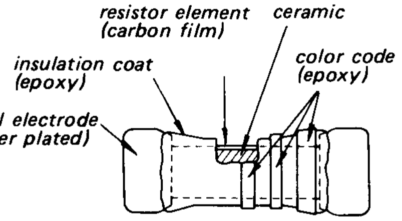
MELF resistors and capacitors have the same dimensions and are distinguished by their background colors: light brown for resistors, and pink or light green for capacitors.

The MELF resistor color coding is the same as for conventional resistors, and MELF capacitor color coding is the same as for tube-type ceramic capacitors. Note, however, that all MELF resistors are rated at ¼W and ±5%.

Components larger than resistors and without a color code are cross conductors, which are used instead of jumper wires.

1. Structure

(Resistors)


resistor element
(carbon film)
ceramic
insulation coat
(epoxy)
color code
(epoxy)
metal electrode
(solder plated)

(Capacitors)

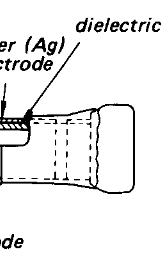
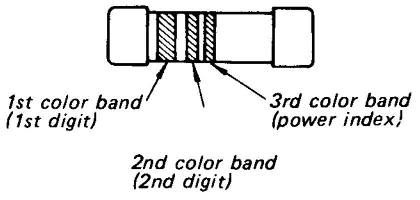
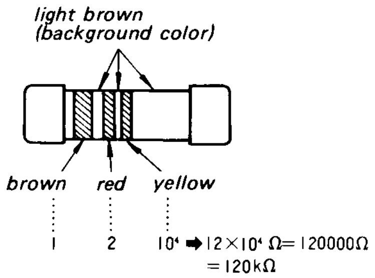

insulation coat
(epoxy)
dielectric
silver (Ag)
electrode
metal electrode
(solder plated)
color code
(epoxy)

Fig. 1

2. Color Code Reading


1st color band
(1st digit)
3rd color band
(power index)
2nd color band
(2nd digit)

(Example of Resistor)


light brown
(background color)
brown
red
yellow
1
2
10⁴ ➡ 12×10⁴ Ω= 120000Ω
= 120kΩ

(Example of Capacitor)

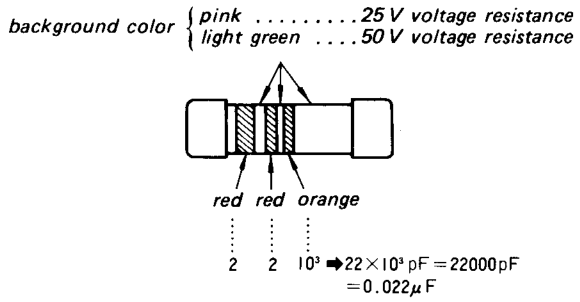

background color
pink ....25 V voltage resistance
light green ....50 V voltage resistance
red
red
orange
2
2
10³ ➡ 22×10³ pF = 22000pF
= 0.022µF

Fig. 2

3. How
Moun

Use a
tip 4 mm
angle sho

1. Brin
equa
com
2. The
(The
amo
the
3. Onc
aside
rem

Model

MELF (Metal Electrodes Face-Bonding) Components (AEP, E Model)

Warning

If MELF components are forcibly removed from the printed circuit board with pincers or pliers, the circuit board pattern is likely to peel away. Always remove MELF components according to the procedure described on the next page. Replace MELF components with the lead type components.

MELF components are soldered directly to the surface of the printed circuit board.

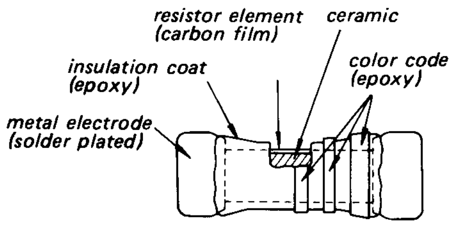
MELF resistors and capacitors have the same dimensions and are distinguished by their background colors: light brown for resistors, and pink or light green for capacitors.

The MELF resistor color coding is the same as for conventional resistors, and MELF capacitor color coding is the same as for tube-type ceramic capacitors. Note, however, that all MELF resistors are rated at ¼W and ±5%.

Components larger than resistors and without a color code are cross conductors, which are used instead of jumper wires.

1. Structure

(Resistors)


resistor element
(carbon film)
ceramic
insulation coat
(epoxy)
color code
(epoxy)
metal electrode
(solder plated)

(Capacitors)

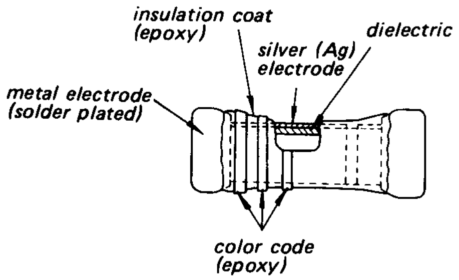
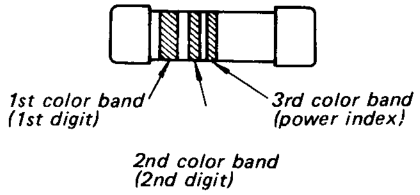
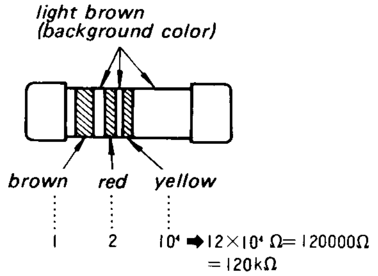

insulation coat
(epoxy)
dielectric
silver (Ag)
electrode
metal electrode
(solder plated)
color code
(epoxy)

Fig. 1

2. Color Code Reading


1st color band
(1st digit)
3rd color band
(power index)
2nd color band
(2nd digit)

(Example of Resistor)


light brown
(background color)
brown
red
yellow
1
2
10⁴ ➡ 12×10⁴ Ω= 120000Ω
= 120kΩ

(Example of Capacitor)

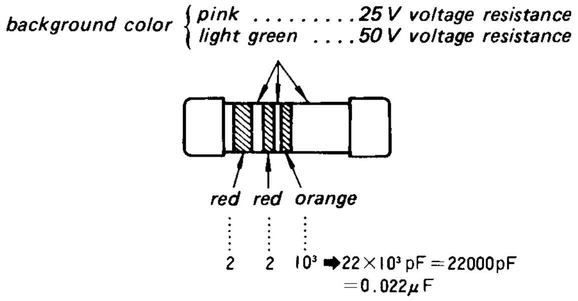

background color
pink ....25 V voltage resistance
light green ....50 V voltage resistance
red
red
orange
2
2
10³ ➡ 22×10³ pF = 22000pF
= 0.022μF

Fig. 2

3. How to Remove MELF Components and Mount Replacements

Use a soldering iron of at least 40W with an iron tip 4mm in diameter and file the tip down to the angle shown in the diagram.

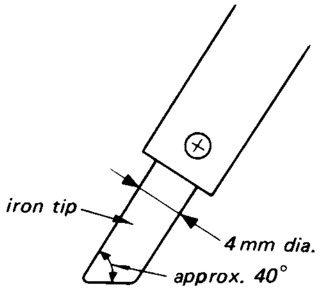

iron tip
4mm dia.
approx. 40°

Fig. 3

1. Bring the flat surface of the soldering iron in equal contact with both soldered ends of the component.
2. The solder should melt in about 4 seconds. (The solder will melt more readily if a small amount of solder is attached to the iron tip and the iron tip is placed against the component.)
3. Once the solder has melted, tap the component aside with the tip of the soldering iron, and remove it from the board.

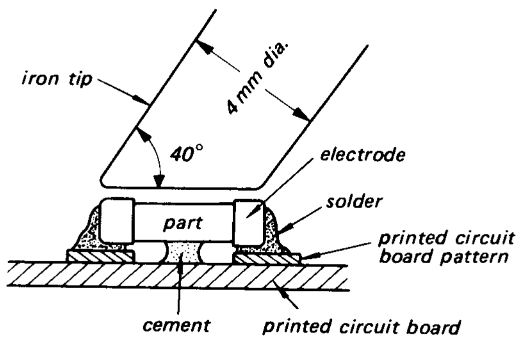

iron tip
4mm dia.
40°
electrode
solder
part
printed circuit
board pattern
cement
printed circuit board

Fig. 4

4. Use lead type resistors or capacitors to replace the MELF components.
   These replacements may be mounted either with short leads (see Fig. 5), or by covering a lead with tubing (see Fig. 6).

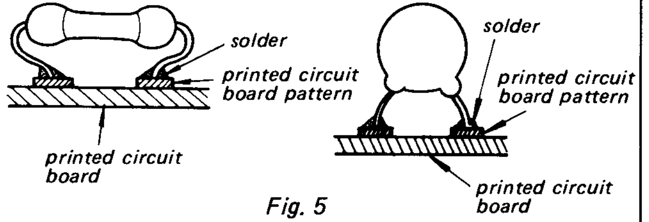

solder
printed circuit
board pattern
printed circuit
board
solder
printed circuit
board pattern
printed circuit
board

Fig. 5

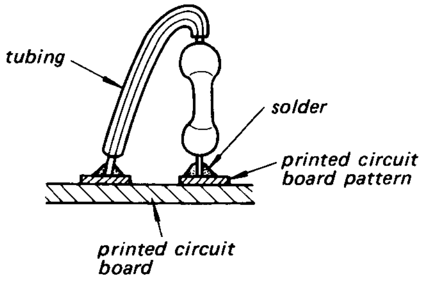
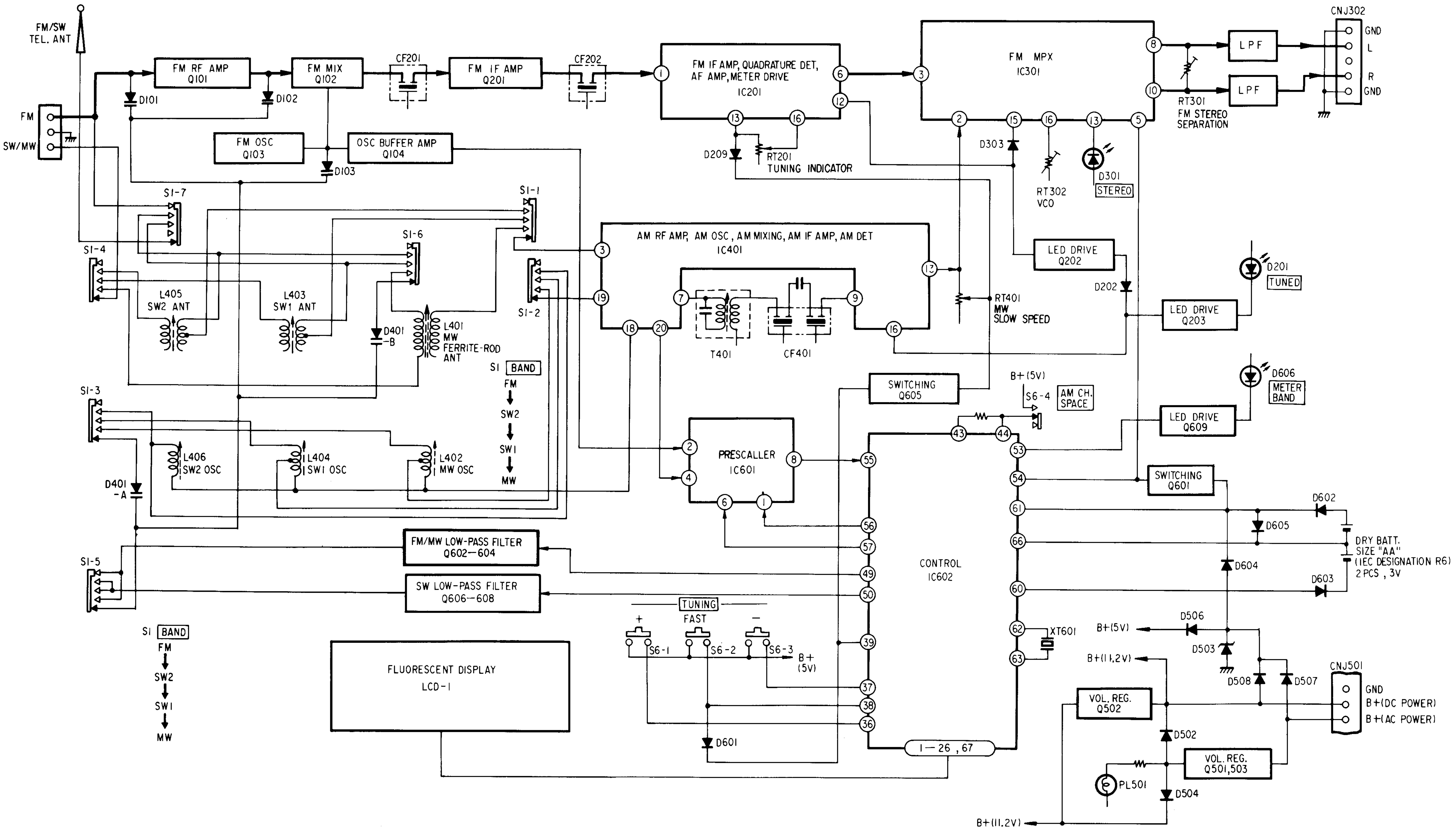

tubing
solder
printed circuit
board pattern
printed circuit
board

Fig. 6

SECTION 1
BLOCK DIAGRAM


FM/SW
TEL. ANT
FM
SW/MW
FM RF AMP
Q101
D101
FM MIX
Q102
D102
CF201
FM IF AMP
Q201
CF202
FM OSC
Q103
OSC BUFFER AMP
Q104
D103
FM IF AMP, QUADRATURE DET,
AF AMP, METER DRIVE
IC201
D209
RT201
TUNING INDICATOR
FM MPX
IC301
D303
RT302
VCO
D301
STEREO
LPF
LPF
CNJ302
GND
L
R
GND
RT301
FM STEREO
SEPARATION
S1-7
S1-1
S1-6
S1-4
S1-2
L405
SW2 ANT
L403
SW1 ANT
D401
-B
L401
MW
FERRITE-ROD
ANT
AM RF AMP, AM OSC, AM MIXING, AM IF AMP, AM DET
IC401
T401
CF401
RT401
MW
SLOW SPEED
LED DRIVE
Q202
D202
LED DRIVE
Q203
D201
TUNED
S1 BAND
FM
SW2
SW1
MW
S1-3
L406
SW2 OSC
L404
SW1 OSC
L402
MW OSC
D401
-A
SWITCHING
Q605
B+(5V)
S6-4
AM CH.
SPACE
D606
METER
BAND
LED DRIVE
Q609
PRESCALLER
IC601
CONTROL
IC602
SWITCHING
Q601
D602
D605
D604
D603
DRY BATT.
SIZE "AA"
(IEC DESIGNATION R6)
2 PCS, 3V
S1-5
FM/MW LOW-PASS FILTER
Q602-604
SW LOW-PASS FILTER
Q606-608
TUNING
+
FAST
−
S6-1
S6-2
S6-3
B+
(5V)
D601
1-26, 67
XT601
B+(5V)
D506
D503
D508
D507
B+(11.2V)
VOL. REG.
Q502
D502
VOL. REG.
Q501,503
PL501
D504
B+(11.2V)
CNJ501
GND
B+(DC POWER)
B+(AC POWER)
S1 BAND
FM
SW2
SW1
MW
FLUORESCENT DISPLAY
LCD-1

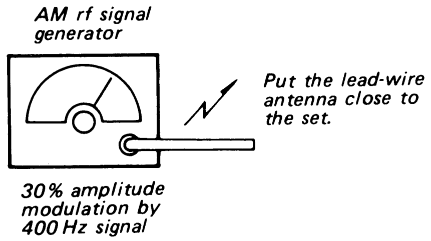
SECTION 2
ADJUSTMENTS

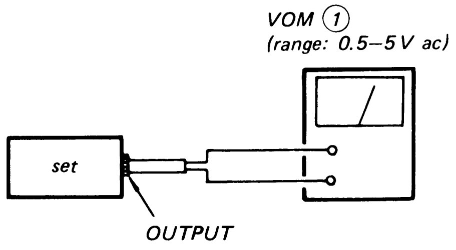
MW/SW SECTION 1

Setting:

Band Selector: MW, SW1, SW2

Setup: Set 9kHz/10kHz selector switch (S6-4) to the 9kHz side.

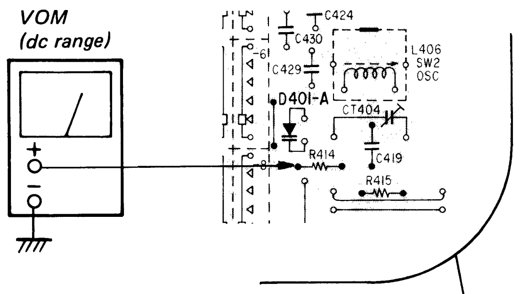

AM rf signal generator
Put the lead-wire antenna close to the set.
30% amplitude modulation by 400 Hz signal


VOM ①
(range: 0.5–5 V ac)
set
OUTPUT

- Repeat the procedures in each adjustment several times, and the frequency coverage and tracking adjustments should be finally done by the trimmer capacitors.

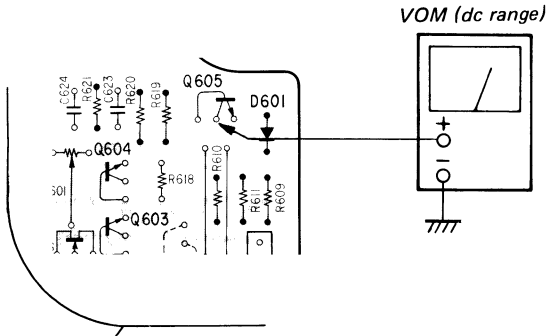
MW/SW1/SW2 OSC Voltage Adjustment

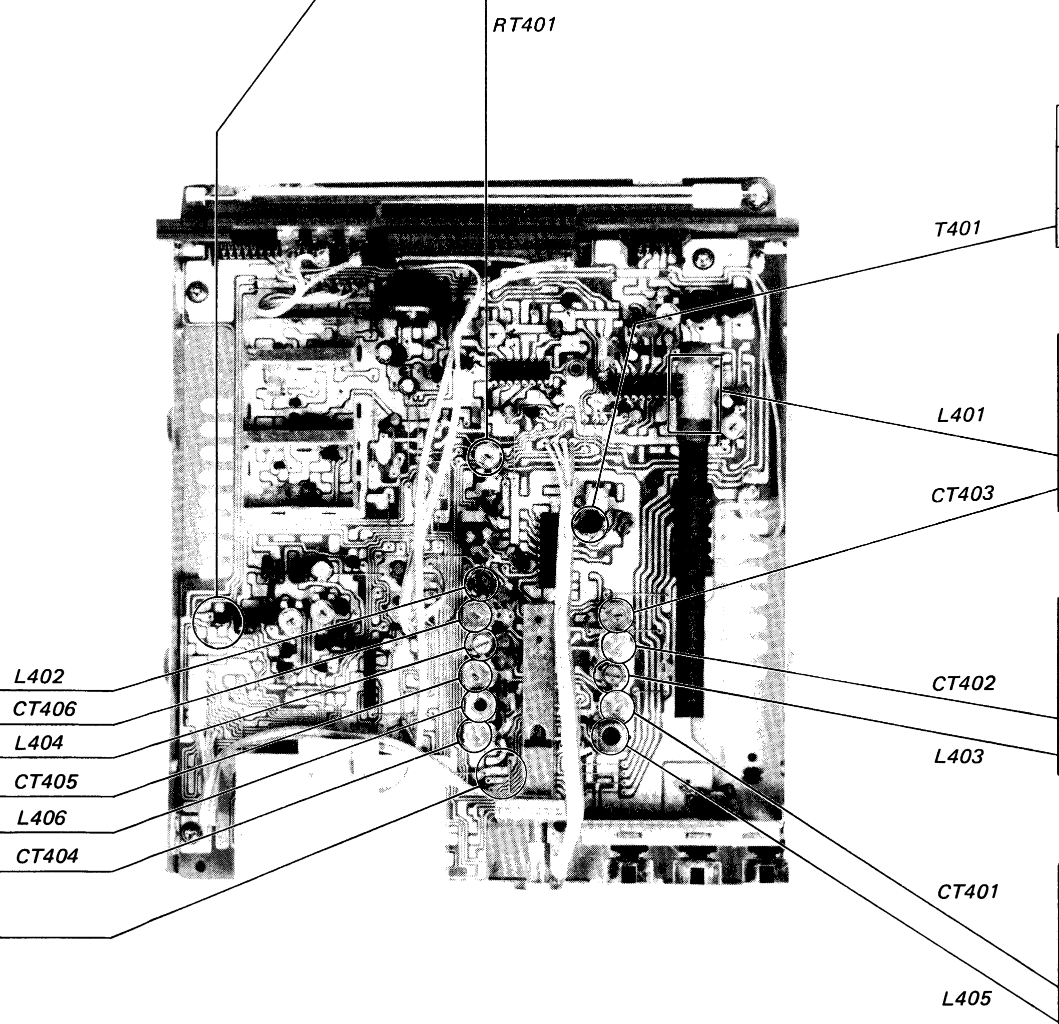
1. Set BAND selector switch (S1) to MW.
2. Push TUNING (+, –) button for 522kHz. Adjust L402 for 1.0 – 1.1V VOM reading.
3. Push the button for 1,602kHz. Adjust CT406 for 8.9 – 9.0V VOM reading.
4. Set BAND selector switch (S1) to SW1.
5. Push TUNING (+, –) button for 3.2MHz. Adjust L404 for 1.0 – 1.1V VOM reading.
6. Push the button for 7.3MHz. Adjust CT405 for 8.9 – 9.0V VOM reading.
7. Set BAND selector switch (S1) to SW2.
8. Push TUNING (+, –) button for 9.5MHz. Adjust L406 for 1.0 – 1.1V VOM reading.
9. Push the button for 21.75MHz. Adjust CT404 for 8.9 – 9.0V VOM reading.


VOM
(dc range)
C424
C430
C429
L406
SW2
OSC
D401-A
CT404
R414
C419
R415

MW Slow Speed Action Level Adjustment

1. Set BAND selector switch (S1) to MW. Confirm that the receiving condition is no signal.
2. Adjust RT401 so that the collector voltage of Q605 is 4.0 – 5.0V.


VOM (dc range)
C624
R621
C623
R620
R619
Q605
D601
Q604
R618
R610
Q603
R611
R609


RT401
T401
L401
CT403
CT402
L403
CT401
L405
L402
CT406
L404
CT405
L406
CT404

MW IF ADJUSTMENT	
Adjust for a maximum reading on VOM ①.	
T401	450kHz

MW TRACKING ADJUSTMENT	
Adjust for a maximum reading on VOM ①.	
L401	603kHz
CT403	1,404kHz

SW1 TRACKING ADJUSTMENT	
Adjust for a maximum reading on VOM ①.	
CT402	7.3MHz
L403	3.2MHz

SW2 TRACKING ADJUSTMENT	
Adjust for a maximum reading on VOM ①.	
CT401	21.75MHz
L405	9.5MHz

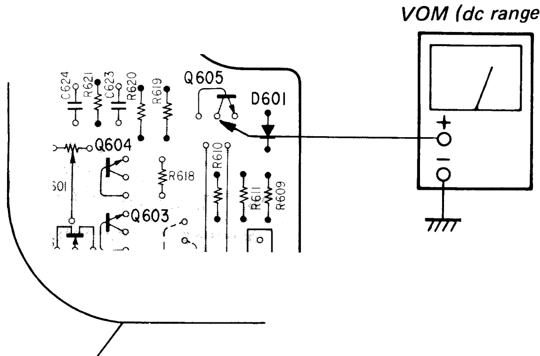
MW/SW S

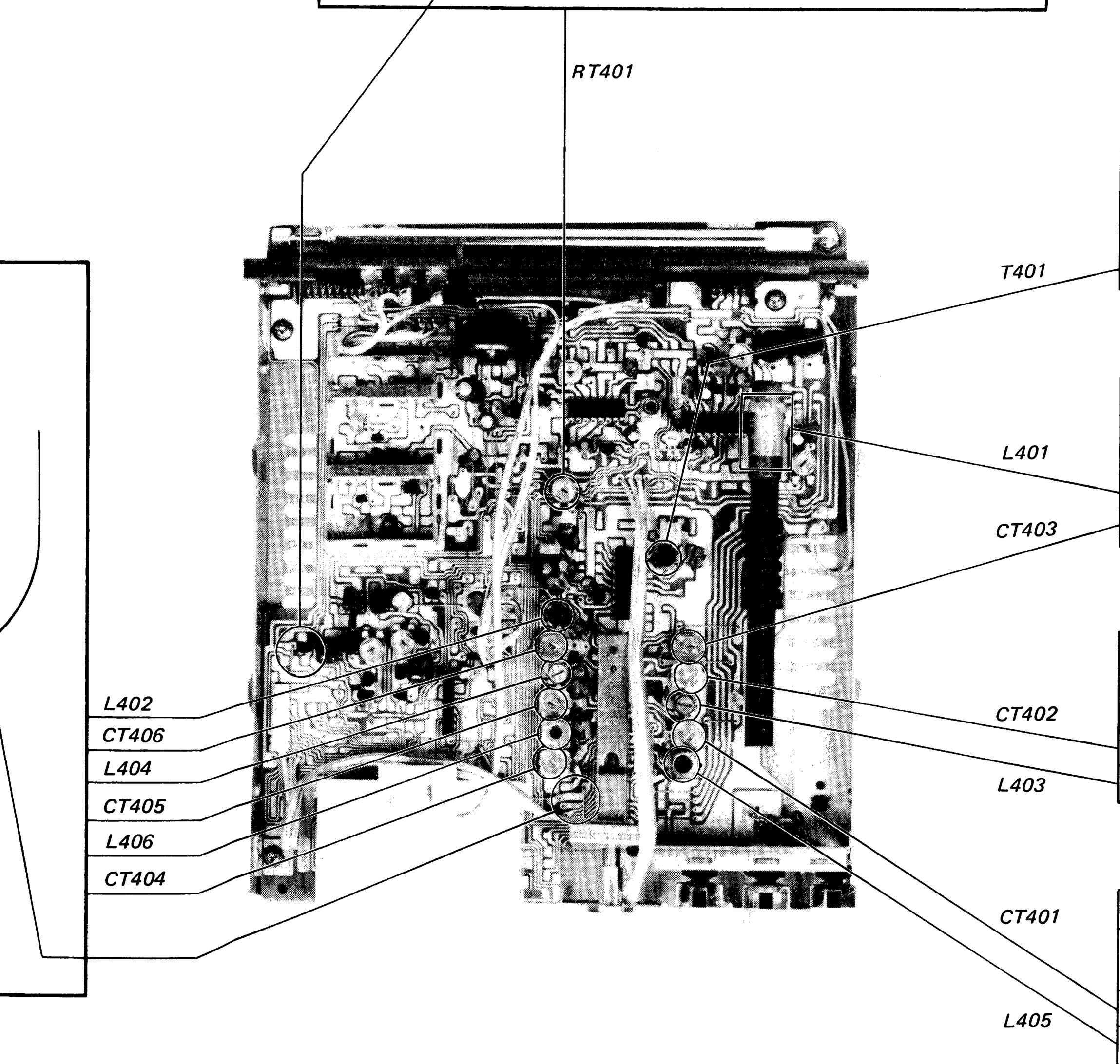
SW1/SW2

1. Conne
2. Set B
3. Push T
4. Adjus below
5. Push the wa
6. Set B that t to 3.2
7. Confi is tun

MW Slow Speed Action Level Adjustment

1. Set BAND selector switch (S1) to MW. Confirm that the receiving condition is no signal.
2. Adjust RT401 so that the collector voltage of Q605 is 4.0 – 5.0V.


VOM (dc range)
Q605
D601
Q604
Q603
C624
R621
R623
R620
R619
R610
R618
R611
R609
+
−


RT401
T401
L401
CT403
CT402
L403
CT401
L405
L402
CT406
L404
CT405
L406
CT404

MW IF ADJUSTMENT	
Adjust for a maximum reading on VOM ①.	
T401	450kHz

MW TRACKING ADJUSTMENT	
Adjust for a maximum reading on VOM ①.	
L401	603kHz
CT403	1,404kHz

SW1 TRACKING ADJUSTMENT	
Adjust for a maximum reading on VOM ①.	
CT402	7.3MHz
L403	3.2MHz

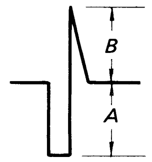
SW2 TRACKING ADJUSTMENT	
Adjust for a maximum reading on VOM ①.	
CT401	21.75MHz
L405	9.5MHz

MW/SW SECTION 2

SW1/SW2 PLL Bias Adjustment

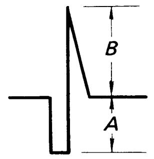
1. Connect the oscilloscope as shown below.
2. Set BAND selector switch (S1) to SW2.
3. Push TUNING (+, –) button for 9.5MHz.
4. Adjust RT603 so that the waveform is as shown below.

A : B = 1 : 1
A is more than 0.65V



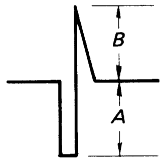
5. Push the button for 21.75MHz. Confirm that the waveform is locked as shown below.

A : B = 0.46V : 0.84V
(reference)



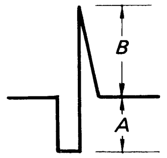
6. Set BAND selector switch (S1) to SW1. Confirm that the waveform is locked when the set is tuned to 3.2MHz.

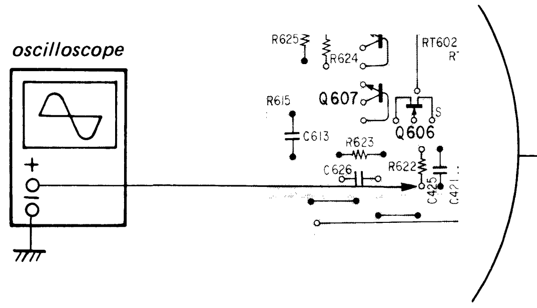
A : B = 1 : 1
A is more than 0.65V

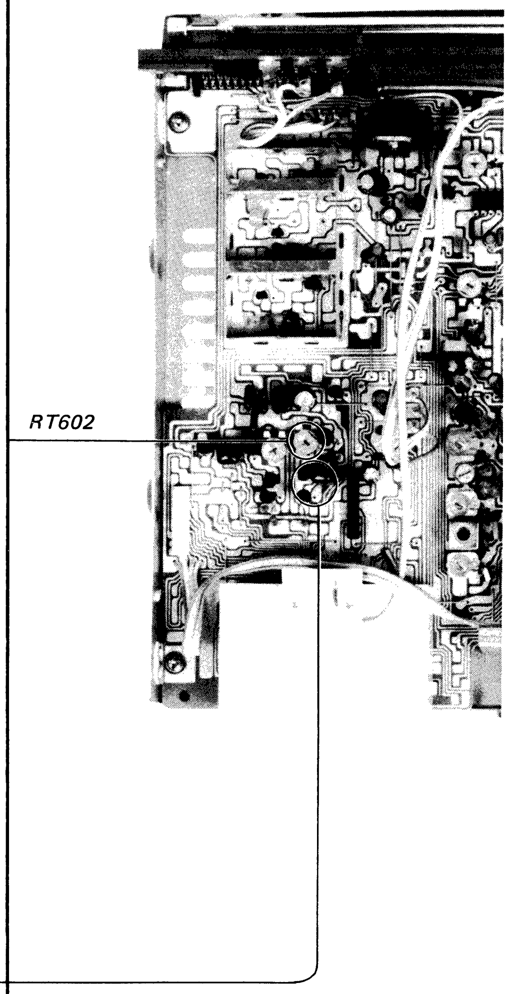


7. Confirm that the waveform is locked when the set is tuned to 7.3MHz.

A : B = 0.46V : 0.84V
(reference)




oscilloscope
+
R625
R624
RT602
R615
Q607
Q606
C613
R623
C626
R622



FM SECTION 1

Setting:

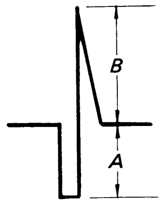
Band Selector: FM

FM rf Stereo Signal	FM rf Monaural Signal
Carrier frequency: 98MHz Modulation: Audio 400Hz, 33.75kHz deviation (45%) Subchannel 38kHz 33.75kHz deviation (45%) Pilot 19kHz 7.5kHz deviation (10%)	Carrier frequency: 98MHz Modulation: 1kHz, 75kHz deviation (100%)

FM/MW PLL Bias Adjustment

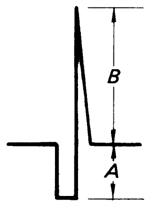
1. Connect the oscilloscope as shown on the right.
2. Set BAND selector switch (S1) to FM.
3. Push TUNING (+, −) button for 87.5MHz.
4. Adjust RT601 so that the waveform is shown below.

   A : B = 2.0 : more than 3.0
   A is approx. 0.4V

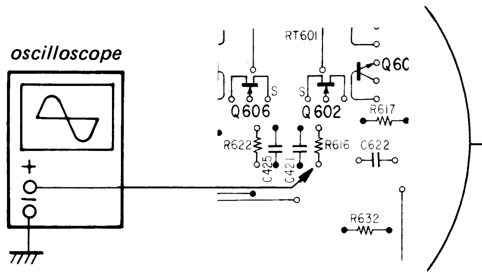


5. Push the button for 108MHz. Confirm that the waveform is locked as shown below.

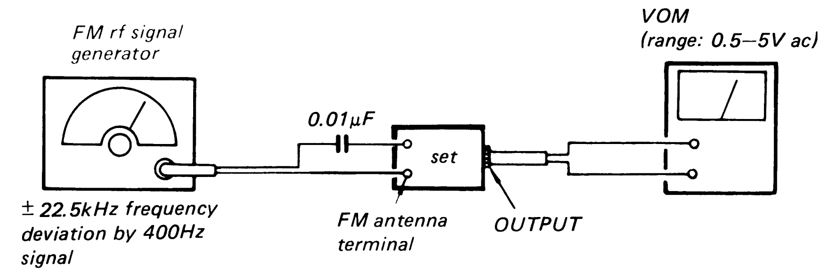
   A : B = 1.5 : 3.5
   A is approx. 0.3V



6. Set BAND selector switch (S1) to MW. Confirm that the waveform is locked when the set is tuned to 522kHz.
7. Confirm that the waveform is locked when the set is tuned to 1,602kHz.

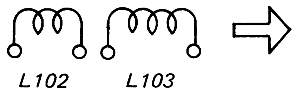

oscilloscope
RT601
Q606
Q602
Q60
R617
R622
R616
C622
R632

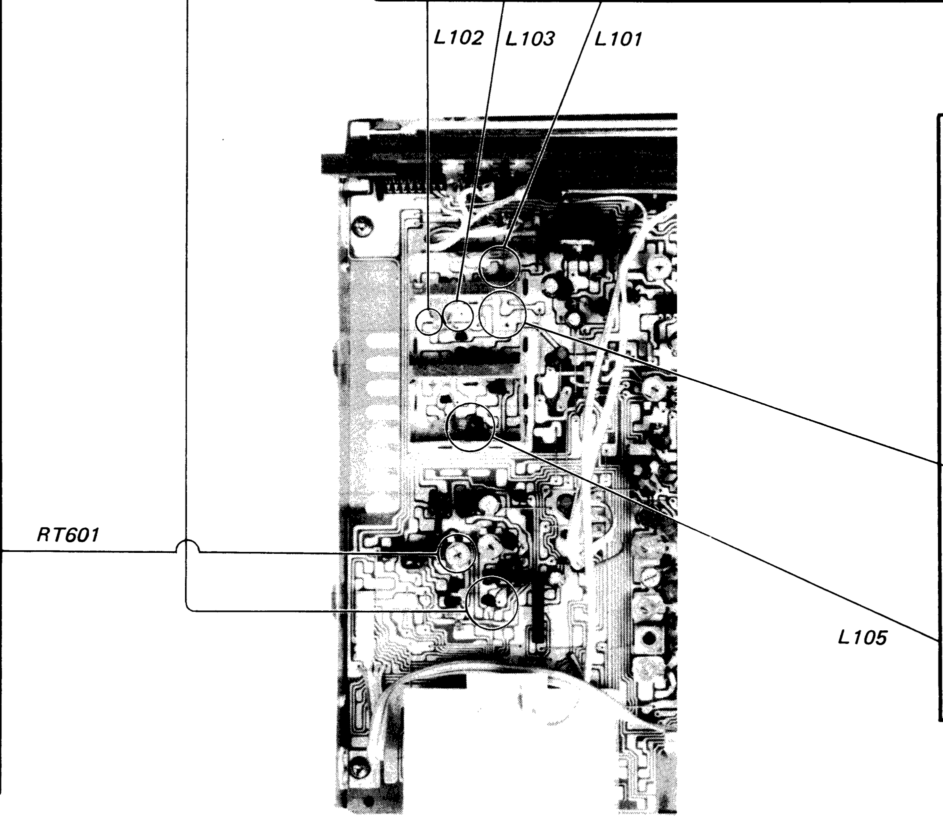
FM Tracking Adjustment


FM rf signal generator
± 22.5kHz frequency deviation by 400Hz signal
0.01μF
set
FM antenna terminal
OUTPUT
VOM (range: 0.5–5V ac)

1. Push TUNING (+, −) button for 98MHz.
2. Approach L102 and L103 not to contact each other.
3. Adjust L101 and L103, and repeat the adjustment 2–3 times for maximum VOM reading.

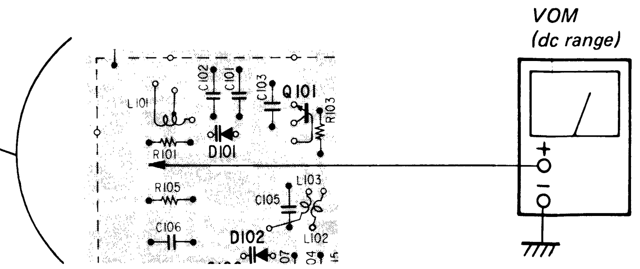
   (Adjust L103 in the direction as shown by arrow Ⓐ.)




L102
L103
L101
RT601
L105

FM OSC Voltage Adjustment

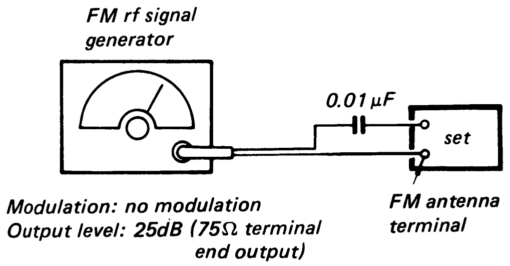
Push TUNING (+, −) button for 108MHz. Adjust L105 for 8.9 – 9V VOM reading.


VOM (dc range)
L101
L102
C101
C103
Q101
R103
R101
D101
R105
C105
L103
C106
D102
L102

FM SECTION 2

TUNED Indicator Adjustment

Setting:


FM rf signal generator
0.01µF
set
FM antenna terminal

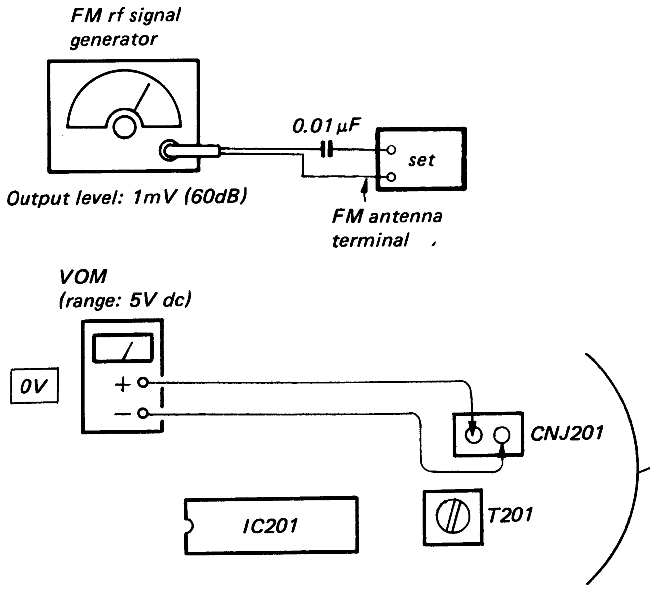
Modulation: no modulation
Output level: 25dB (75Ω terminal end output)

Procedure:

Adjust RT201 so that TUNED indicator (D201) lights up.

FM Discriminator Adjustment

Setting:


FM rf signal generator
0.01µF
set
FM antenna terminal
VOM (range: 5V dc)
0V
+
−
CNJ201
IC201
T201

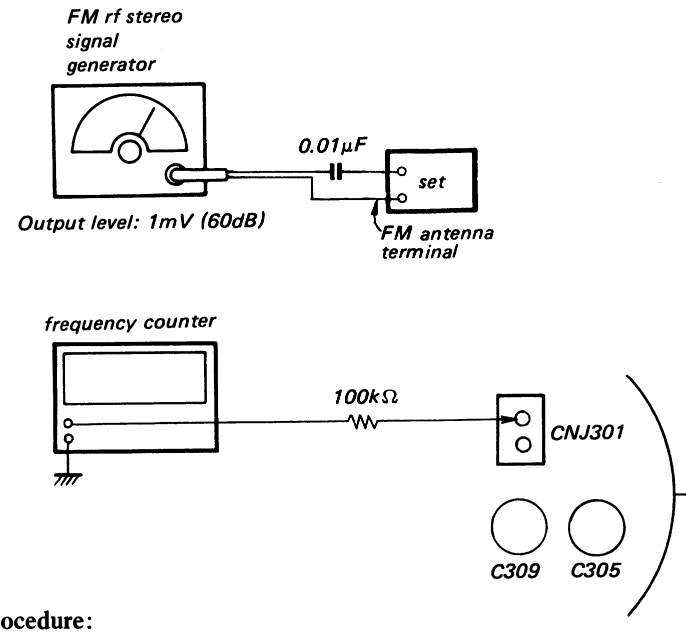
Output level: 1mV (60dB)

Procedure:

Push TUNING (+, −) button for 98MHz. Adjust T201 for 0V VOM reading.

VCO Adjustment

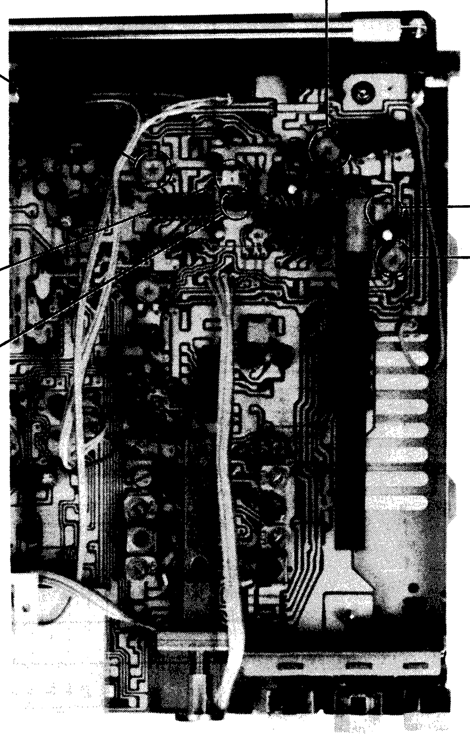
Setting:


FM rf stereo signal generator
0.01µF
set
FM antenna terminal
frequency counter
100kΩ
CNJ301
C309
C305

Output level: 1mV (60dB)

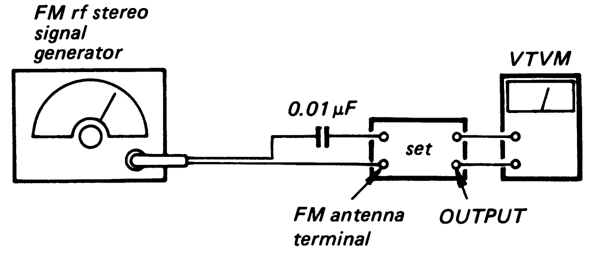
Procedure:

Adjust RT302 so that the frequency counter indicates 19kHz ±50Hz.


RT201
RT302
RT301
T201

FM Stereo Separation Adjustment

Procedure:


FM rf stereo signal generator
VTVM
0.01µF
set
FM antenna terminal
OUTPUT

Carrier frequency: 98MHz
Output level: 1mV (60dB)
Modulation:
Audio (400Hz): 33.75kHz deviation (45%)
Pilot (19kHz): 7.5kHz deviation (10%)
Sub-channel: 33.75kHz deviation (45%)

FM stereo signal generator output channel	VTVM connection	VTVM reading (dB)
L-CH	L-CH	Ⓐ
R-CH	L-CH	Ⓑ Adjust RT301 for minimum reading.
R-CH	R-CH	Ⓒ
L-CH	R-CH	Ⓓ Adjust RT301 for minimum reading.

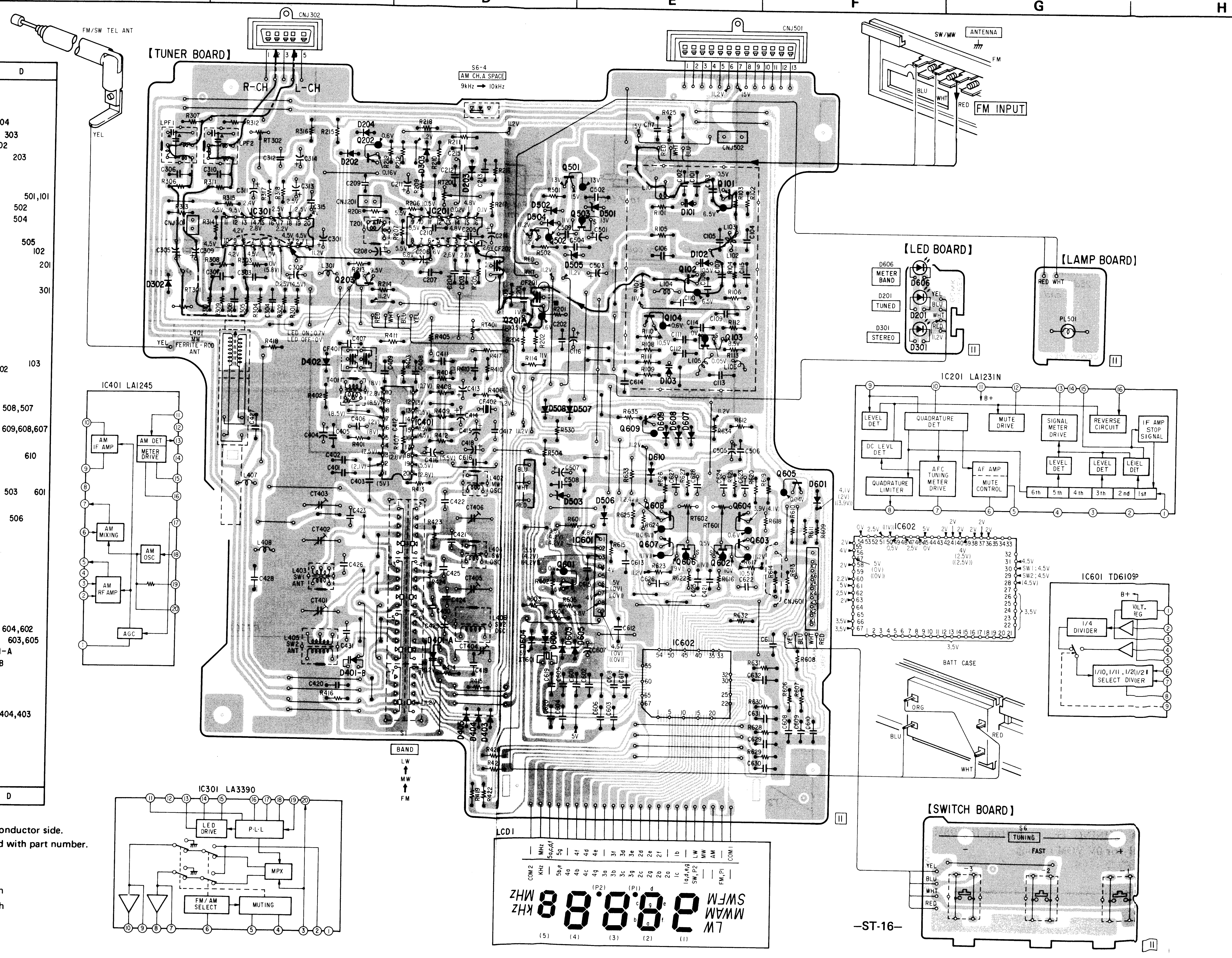
L-CH Stereo separation: Ⓐ − Ⓑ
R-CH Stereo separation: Ⓒ − Ⓓ

The separations of both channels should be equal.

SECTION 3
DIAGRAMS

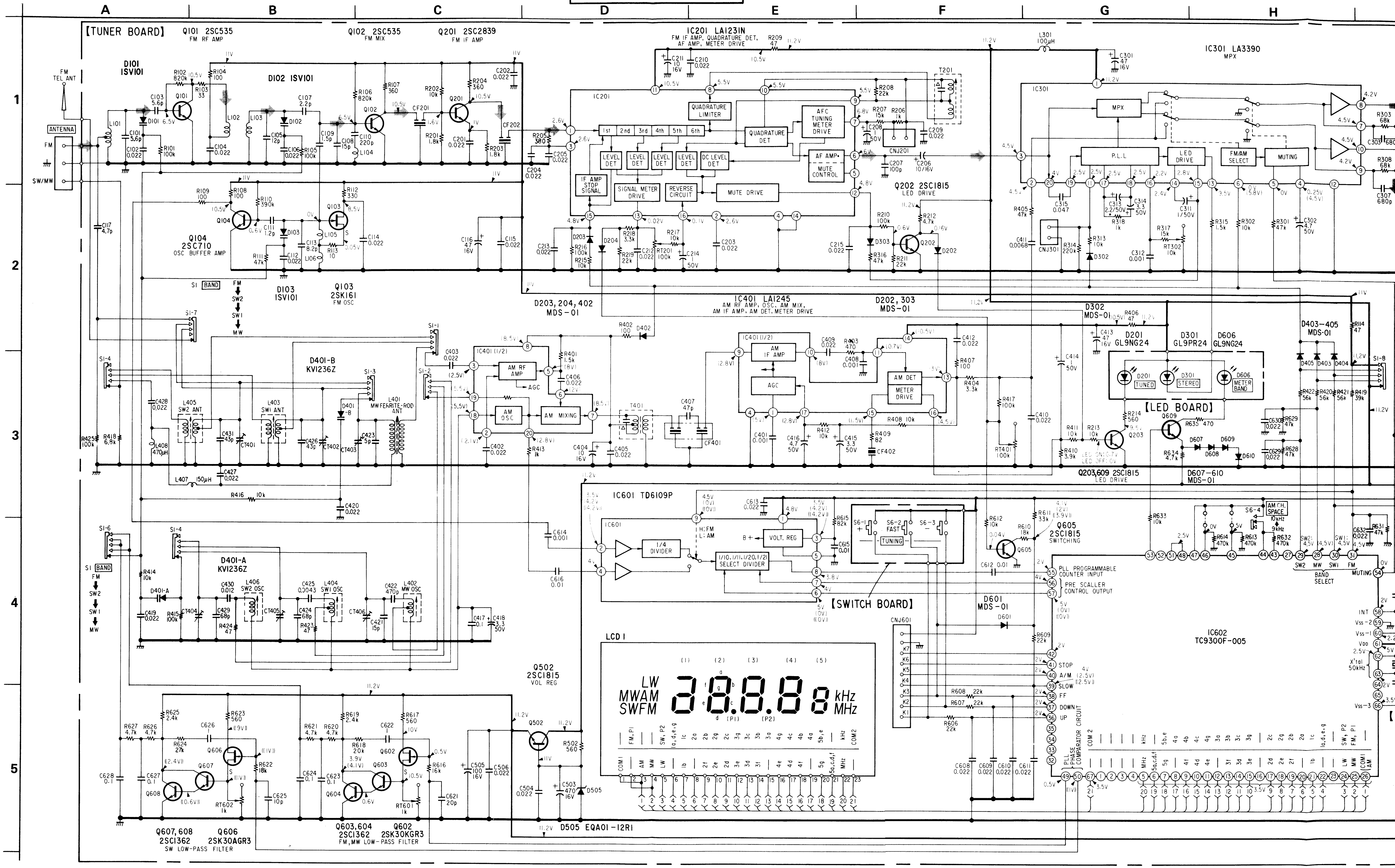
3-1. MOUNTING DIAGRAM

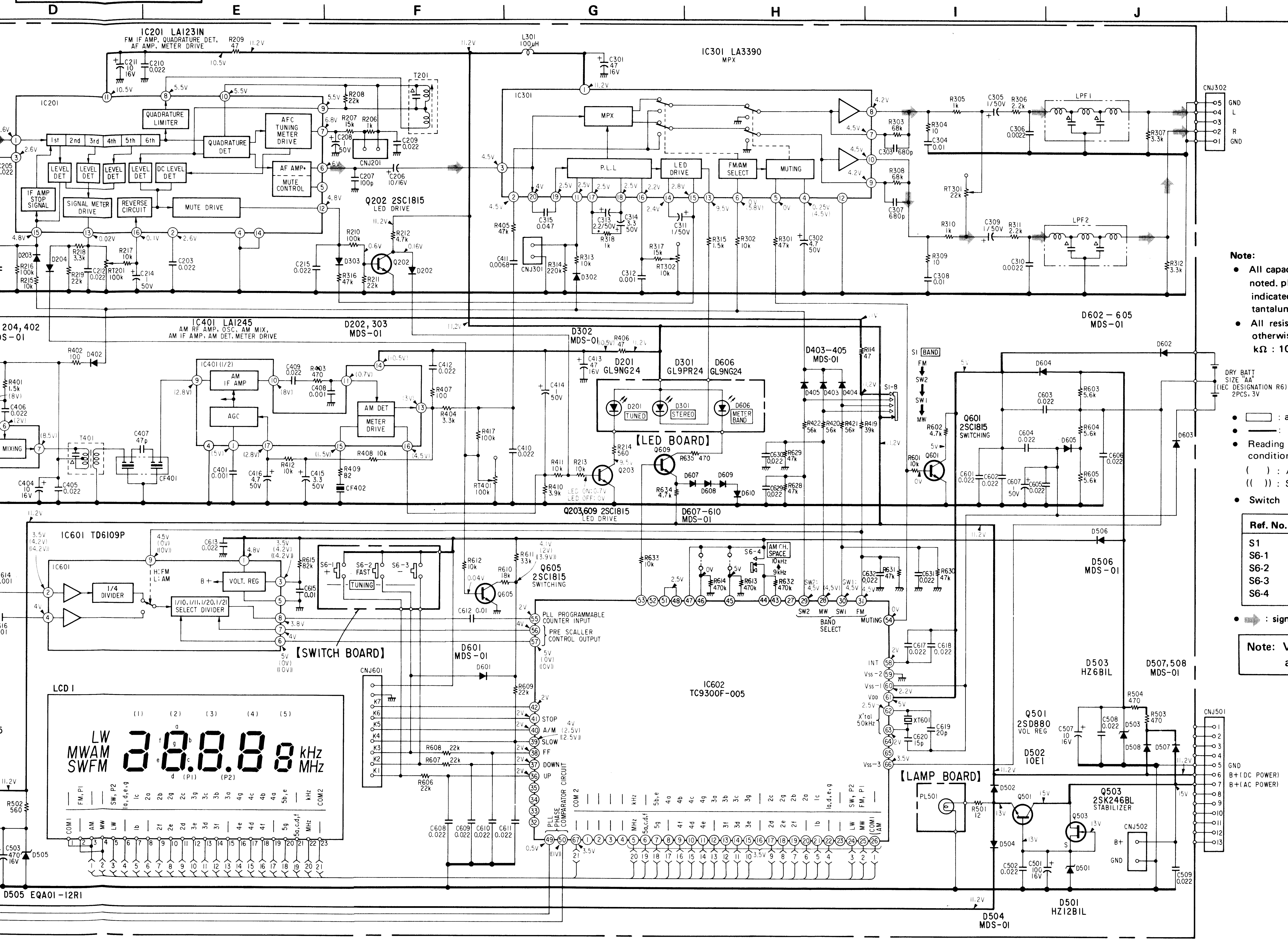
Q , IC	D
	204
	303
202	202
	203
501	
101	
	501,101
	502
503	
	504
IC201	
IC301 502	
	505
	102
	201
203 102	
	302
	301
201,104	
103	
	103
	402
	508,507
	609,608,607
IC401	
609	
	610
605	503 601
608,604	506
607,603	
606,602	
IC601	
601	
	604,602
	603,605
	401-A
	401-B
IC602	
	405,404,403
Q , IC	D


A
B
C
D
E
F
G
H
1
2
3
4
5
FM/SW TEL ANT
YEL
CNJ302
【TUNER BOARD】
R-CH
L-CH
S6-4
AM CH.A SPACE
9kHz → 10kHz
CNJ501
CNJ502
CNJ201
CNJ301
CNJ601
IC301
IC201
IC401
IC601
IC602
L401 MW FERRITE-ROD ANT
LED ON:0.7V
LED OFF:0V
BAND
LW
MW
FM
LCD1
SW/MW
ANTENNA
FM
BLU
WHT
RED
FM INPUT
【LED BOARD】
D606 METER BAND
D201 TUNED
D301 STEREO
【LAMP BOARD】
PL501
IC201 LA1231N
LEVEL DET
QUADRATURE DET
MUTE DRIVE
SIGNAL METER DRIVE
REVERSE CIRCUIT
IF AMP STOP SIGNAL
DC LEVL DET
QUADRATURE LIMITER
AFC TUNING METER DRIVE
AF AMP
MUTE CONTROL
6th
5th
4th
3th
2nd
1st
B+
IC401 LA1245
AM IF AMP
AM DET
METER DRIVE
AM MIXING
AM OSC
AM RF AMP
AGC
IC301 LA3390
LED DRIVE
P-L-L
MPX
FM/AM SELECT
MUTING
IC601 TD6109P
VILT. REG
1/4 DIVIDER
1/10, 1/11, 1/20, 1/21 SELECT DIVIDER
BATT CASE
ORG
【SWITCH BOARD】
S6
TUNING
FAST
LW MWAM SWFM
KHz MHz
COM2
COM1

Note:
- ■ : part mounted on the conductor side.
- [ ]← : indicates side identified with part number.
- ░ : B + pattern
- ━➡━ : signal path
- ━━➡ : L-CH signal path
- ━·━➡ : R-CH signal path

3-2. SCHEMATIC DIAGRAM


A
B
C
D
E
F
G
H
1
2
3
4
5
【TUNER BOARD】
Q101 2SC535 FM RF AMP
Q102 2SC535 FM MIX
Q201 2SC2839 FM IF AMP
IC201 LA1231N FM IF AMP, QUADRATURE DET, AF AMP, METER DRIVE
IC301 LA3390 MPX
D101 1SV101
D102 1SV101
FM TEL ANT
ANTENNA
FM
SW/MW
Q104 2SC710 OSC BUFFER AMP
D103 1SV101
Q103 2SK161 FM OSC
S1 BAND
FM → SW2 → SW1 → MW
QUADRATURE LIMITER
QUADRATURE DET
AFC TUNING METER DRIVE
AF AMP
MUTE CONTROL
LEVEL DET
SIGNAL METER DRIVE
REVERSE CIRCUIT
MUTE DRIVE
IF AMP STOP SIGNAL
DC LEVEL DET
1st 2nd 3rd 4th 5th 6th
T201
CNJ201
CNJ301
Q202 2SC1815 LED DRIVE
MPX
P.L.L
LED DRIVE
FM/AM SELECT
MUTING
D203, 204, 402 MDS-01
IC401 LA1245 AM RF AMP, OSC, AM MIX, AM IF AMP, AM DET, METER DRIVE
D202, 303 MDS-01
D302 MDS-01
D201 GL9NG24
D301 GL9PR24
D606 GL9NG24
D403–405 MDS-01
TUNED
STEREO
METER BAND
【LED BOARD】
Q203, 609 2SC1815 LED DRIVE
D607–610 MDS-01
D401-B KV1236Z
L401 MW FERRITE-ROD ANT
L405 SW2 ANT
L403 SW1 ANT
AM RF AMP
AGC
AM OSC
AM MIXING
AM IF AMP
AM DET
METER DRIVE
T401
CF401
CF402
IC601 TD6109P
1/4 DIVIDER
H: FM L: AM
VOLT. REG
1/10, 1/11, 1/20, 1/21 SELECT DIVIDER
【SWITCH BOARD】
S6-1 S6-2 FAST S6-3 TUNING
Q605 2SC1815 SWITCHING
D601 MDS-01
S6-4 AM CH. SPACE 10kHz 9kHz
IC602 TC9300F-005
PLL PROGRAMMABLE COUNTER INPUT
PRE SCALLER CONTROL OUTPUT
STOP
A/M
SLOW
FF
DOWN
UP
PLL PHASE COMPARATOR CIRCUIT
BAND SELECT
MUTING
INT
X'tal 50kHz
CNJ601
LCD1
LW MWAM SWFM
kHz MHz
D401-A KV1236Z
L406 SW2 OSC
L404 SW1 OSC
L402 MW OSC
Q502 2SC1815 VOL REG
D505 EQA01-12R1
Q607, 608 2SC1362
Q606 2SK30AGR3
SW LOW-PASS FILTER
Q603, 604 2SC1362
Q602 2SK30KGR3
FM, MW LOW-PASS FILTER
11.2V


D
E
F
G
H
I
J
K
1
2
3
4
5
IC201 LA1231N
FM IF AMP, QUADRATURE DET, AF AMP, METER DRIVE
QUADRATURE LIMITER
QUADRATURE DET
AFC TUNING METER DRIVE
AF AMP
MUTE CONTROL
LEVEL DET
DC LEVEL DET
IF AMP STOP SIGNAL
SIGNAL METER DRIVE
REVERSE CIRCUIT
MUTE DRIVE
T201
CNJ201
Q202 2SC1815 LED DRIVE
L301 100μH
IC301 LA3390 MPX
MPX
P.L.L
LED DRIVE
FM/AM SELECT
MUTING
LPF1
LPF2
CNJ302
GND
L
R
GND
CNJ301
D202, 303 MDS-01
D302 MDS-01
D201 GL9NG24
D301 GL9PR24
D606 GL9NG24
TUNED
STEREO
METER BAND
【LED BOARD】
IC401 LA1245
AM RF AMP, OSC, AM MIX, AM IF AMP, AM DET, METER DRIVE
AM IF AMP
AGC
AM DET
METER DRIVE
MIXING
T401
CF401
CF402
Q203,609 2SC1815 LED DRIVE
D607-610 MDS-01
D403-405 MDS-01
S1 BAND
FM
SW2
SW1
MW
Q601 2SC1815 SWITCHING
D602-605 MDS-01
DRY BATT SIZE "AA" (IEC DESIGNATION R6) 2PCS, 3V
IC601 TD6109P
1/4 DIVIDER
VOLT. REG
1/10, 1/11, 1/20, 1/21 SELECT DIVIDER
H: FM L: AM
S6-1
S6-2 FAST
S6-3
TUNING
【SWITCH BOARD】
Q605 2SC1815 SWITCHING
S6-4
AM CH. SPACE 10kHz 9kHz
PLL PROGRAMMABLE COUNTER INPUT
PRE SCALLER CONTROL OUTPUT
D601 MDS-01
CNJ601
IC602 TC9300F-005
BAND SELECT
MUTING
INT
Vss-2
Vss-1
VDD
X'tal 50kHz
XT601
Vss-3
STOP
A/M
SLOW
FF
DOWN
UP
PLL PHASE COMPARATOR CIRCUIT
LCD 1
LW MWAM SWFM
kHz MHz
(P1) (P2)
D506 MDS-01
D503 HZ6B1L
D507,508 MDS-01
Q501 2SD880 VOL REG
D502 10E1
【LAMP BOARD】
PL501
Q503 2SK246BL STABILIZER
CNJ502
B+
GND
CNJ501
GND
B+(DC POWER)
B+(AC POWER)
D501 HZ12B1L
D504 MDS-01
D505 EQA01-12R1
204, 402
DS-01

Note:

- All capacitors are in μF unless otherwise noted. pF : μμF 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in ohms, ¼ W unless otherwise noted.
  kΩ : 1000 Ω, MΩ : 1000 kΩ

- ▭ : adjustment for repair.
- ▬ : B+ bus.
- Reading are taken under no-signal conditions.
  ( ) : AM
  (( )) : SW
- Switch

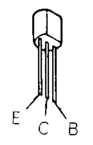
Ref. No.	Switch	Position
S1	BAND	FM
S6-1	TUNING (+)	OFF
S6-2	TUNING (FAST)	OFF
S6-3	TUNING (−)	OFF
S6-4	AM CH. SPACE	9kHz

- ➡ : signal path

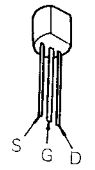
Note: Voltages are measured with a VOM (50kΩ/V).

- **Semiconductor Lead Layouts**

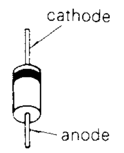
2SC535
2SC1362
2SC1364



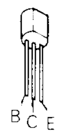
2SK30A-GR3
2SK246-BL



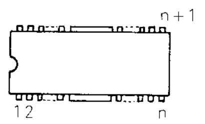
1S1555
10E2
EQA01-12R1
HZ6B1L
HZ12B1L


cathode
anode

2SC710-14

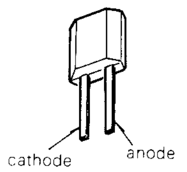


LA1231
LA1245
LA3390

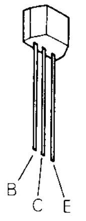


(Top view)

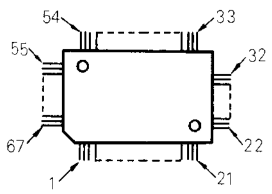
1SV101


cathode
anode

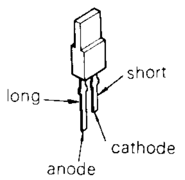
2SC2839



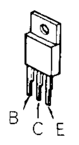
TC9300F-005


54
33
55
32
67
22
1
21

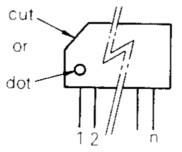
GL-9NG24
GL-9PR24


short
long
cathode
anode

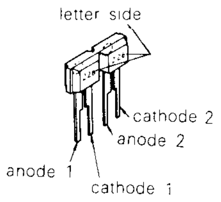
2SD880



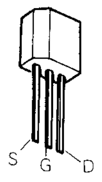
TD6109P


cut
or
dot
1 2
n

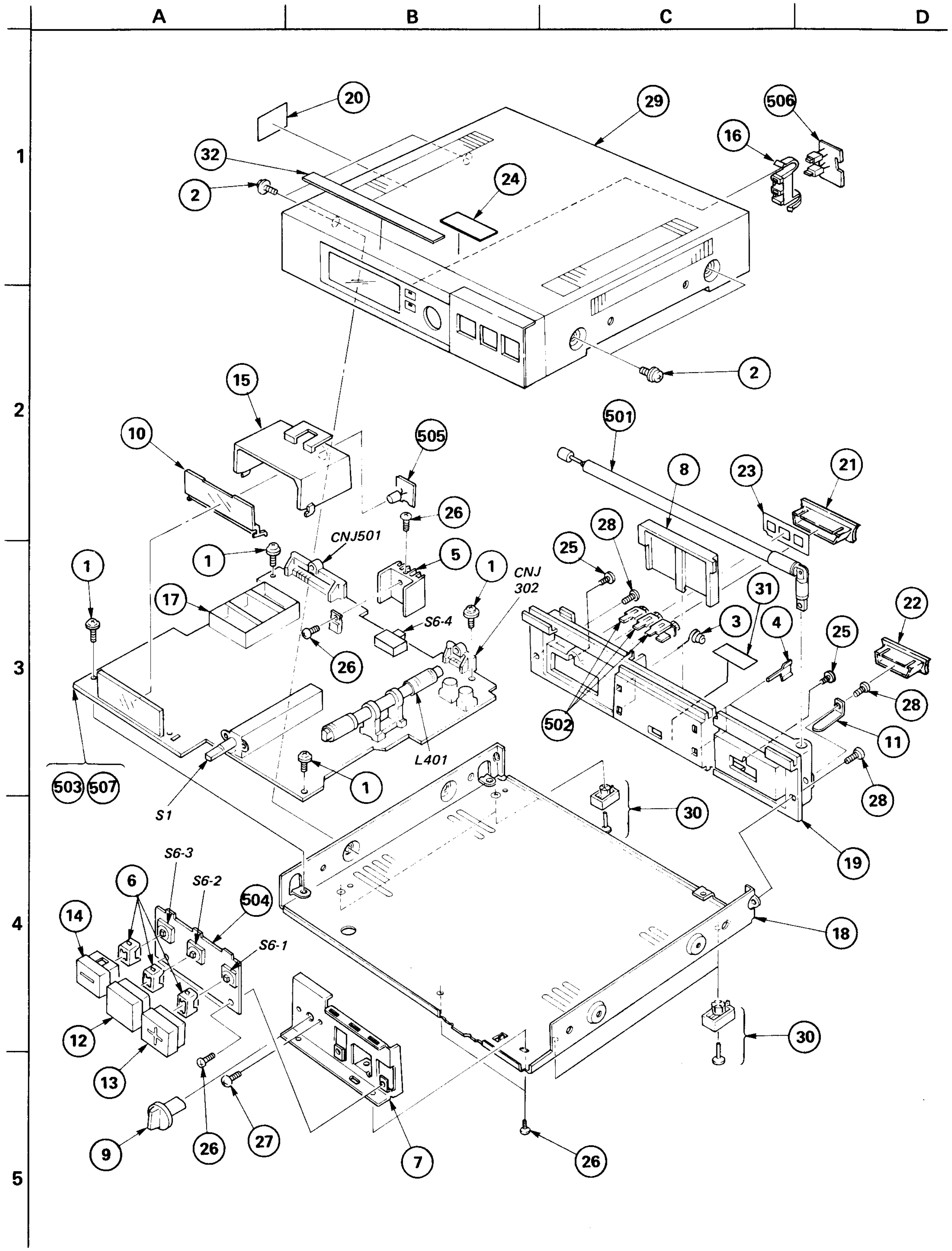
KV1236Z2


letter side
cathode 2
anode 2
anode 1
cathode 1

2SK161



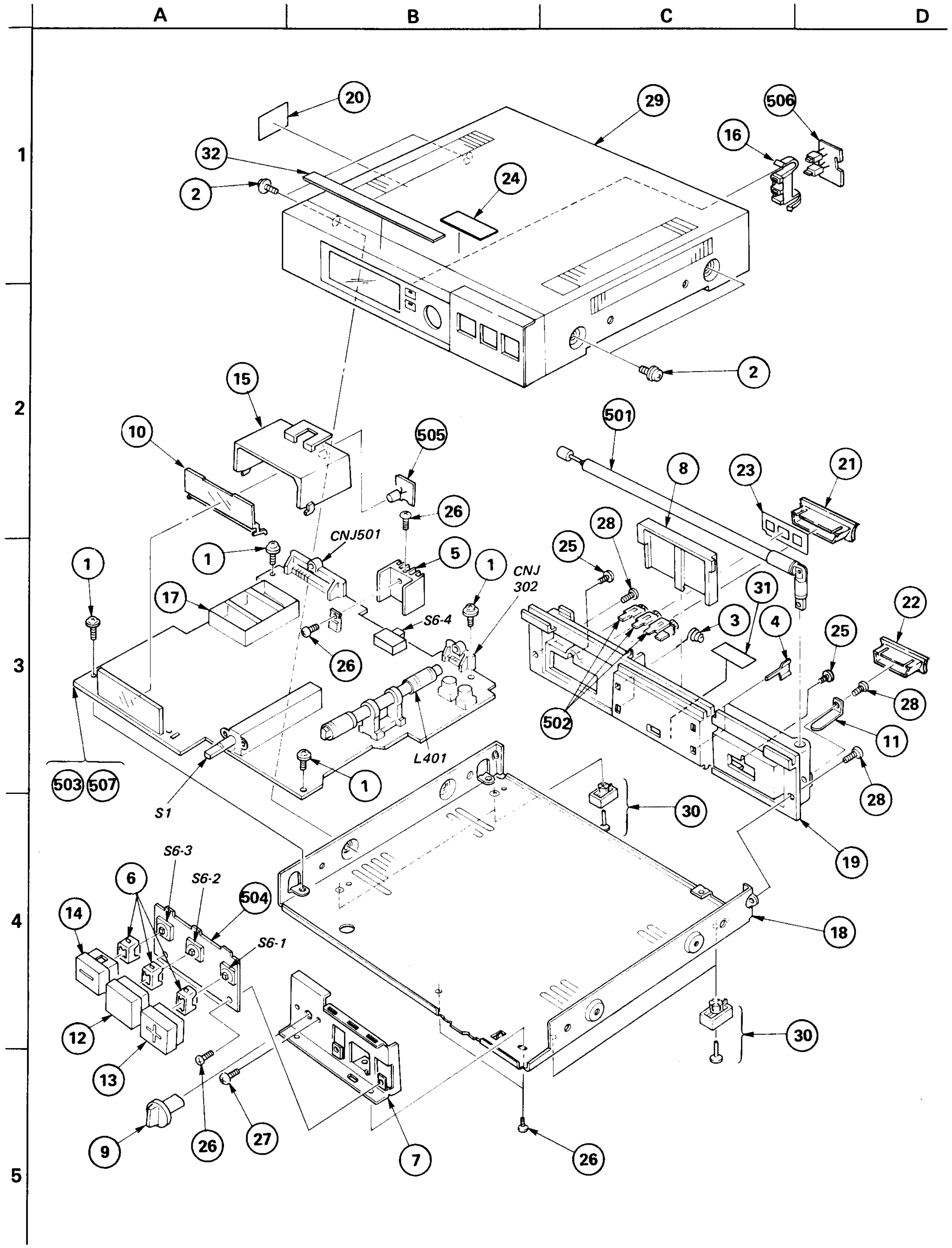
SECTION 4
EXPLODED VIEW AND PARTS LIST


A
B
C
D
1
2
3
4
5
20
29
506
32
24
16
2
2
15
10
505
501
8
23
21
26
1
CNJ501
5
1
CNJ302
25
28
31
1
17
S6-4
3
4
22
26
25
28
502
503
507
L401
1
11
S1
30
28
19
S6-3
6
S6-2
504
14
S6-1
18
12
30
13
9
26
27
7
26

No.	Part
1	3-70
2	3-70
3	3-88
4	3-88
5	♠;4-86
6	4-88
7	♠;4-88
8	4-88
9	4-88
10	4-88
11	♠;4-88
12	4-88
13	4-88
14	4-88
15	♠;4-88
16	4-88
17	♠;4-88
18	♠;4-88
19	4-88
20	4-88
21	4-88
22	4-88
23	4-88
24	4-88
25	7-68
26	7-68
27	7-68
28	7-68
29	A-43
30	X-48
31	4-86
32	4-88

NOTE:
- Items with
cription a
are seldom
- Items mark
thev are s
service.
pated when
- Due to sta
numbers (Δ
may be dif
set.

SECTION 4
EXPLODED VIEW AND PARTS LIST



GENERAL SECTION

No.	Part No.	Description
1	3-701-589-00	SCREW, SELF-TAPPING
2	3-703-354-00	SCREW, CASE, CLAW
3	3-883-424-00	SPRING
4	3-883-428-00	PLATE, TERMINAL (POSITIVE)
5	♠;4-863-132-00	HEAT SINK (SMALL)
6	4-881-725-00	RING (TACT), FLEXIBLE
7	♠;4-884-844-00	CHASSIS, SUB
8	4-884-845-00	LID, BATTERY CASE
9	4-884-847-00	KNOB, ROTARY SWITCH
10	4-884-848-00	ILLUMINATOR
11	♠;4-884-850-00	LUG, ANTENNA
12	4-884-852-00	KNOB (16X16), SQUARE (FAST)
13	4-884-853-00	KNOB (16X16), SQUARE (+)
14	4-884-854-00	KNOB (16X16), SQUARE (-)
15	♠;4-884-856-00	HOUSE, LAMP
16	4-884-857-00	HOLDER, LED
17	♠;4-884-858-00	PLATE, SHIELD
18	♠;4-884-859-00	CHASSIS
19	4-884-860-01	PLATE, JACK
20	4-884-872-00	LABEL, MODEL NUMBER
21	4-884-874-00	COVER, CONNECTOR (A)
22	4-884-876-00	COVER, CONNECTOR (B)
23	4-884-915-00	LABEL, ANTENNA
24	4-884-927-00	LABEL (SYSTEM), CAUTION
25	7-685-547-19	SCREW +BTP 3X10 TYPE2 N-S
26	7-685-871-01	SCREW +BVTT 3X6 (S)
27	7-685-871-09	SCREW +BVTT 3X6 (S)
28	7-685-872-09	SCREW +BVTT 3X8 (S)
29	A-4322-460-A	CASE ASSY, PANEL
30	X-4884-801-0	FOOT ASSY, RUBBER
31	4-866-752-00	LABEL (A), SWITCH
32	4-884-873-00	SEAL, INDICATION, METER BAND

ELECTRICAL PARTS

Ref.No.	Part No.	Description			
501	1-501-270-00	ANTENNA, TELESCOPIC			
502	1-536-742-00	TERMINAL BOARD, ANTENNA			
503	♠;1-608-558-00	PC BOARD, TUNER			
504	♠;1-608-559-00	PC BOARD, SWITCH			
505	♠;1-608-560-00	PC BOARD, LAMP			
506	♠;1-608-561-00	PC BOARD, LED			
507	♠;A-4351-324-A	MOUNTED PCB, TUNER			
C312	1-104-077-00	POLYSTYRENE	0.001MF	5%	50V
C421	1-102-880-00	CERAMIC	15PF	5%	50V
C422	1-104-069-00	POLYSTYRENE	470PF	5%	50V
C423	1-101-997-00	CERAMIC	5PF	0.5PF	50V
C424	1-102-676-00	CERAMIC	68PF	5%	50V
C425	1-104-092-00	POLYSTYRENE	0.0043MF	5%	50V
C426	1-102-674-00	CERAMIC	43PF	5%	50V
C429	1-102-860-00	CERAMIC	68PF	5%	50V
C431	1-102-727-00	CERAMIC	43PF	5%	50V
C622	1-130-644-00	FILM	1MF	5%	50V
C623	1-130-632-00	FILM	0.1MF	5%	50V
C624	1-130-632-00	FILM	0.1MF	5%	50V
C626	1-130-644-00	FILM	1MF	5%	50V
C627	1-130-632-00	FILM	0.1MF	5%	50V
C628	1-130-632-00	FILM	0.1MF	5%	50V
CF201	1-527-968-71	FILTER, CERAMIC			
CF202	1-527-968-71	FILTER, CERAMIC			
CF401	1-527-937-00	FILTER, CERAMIC			
CF402	1-527-981-00	FILTER, CERAMIC			
♠CNJ201;	1-560-060-00	PIN, CONNECTOR 2P			
♠CNJ301;	1-560-060-00	PIN, CONNECTOR 2P			
CNJ302	1-562-067-00	SOCKET, CONNECTOR 5P			
CNJ501	1-562-068-00	SOCKET, CONNECTOR 13P			
♠CNJ502;	1-535-115-00	TERMINAL			
♠CNJ601;	1-560-339-00	PIN, CONNECTOR 9P			
♠CNJ602;	1-535-116-00	TERMINAL			
CT401	1-141-181-11	CAP, TRIMMER			
CT402	1-141-181-11	CAP, TRIMMER			
CT403	1-141-180-00	CAP, TRIMMER 15P			
CT404	1-141-181-11	CAP, TRIMMER			
CT405	1-141-181-11	CAP, TRIMMER			
CT406	1-141-180-00	CAP, TRIMMER 15P			
D101	8-719-800-09	DIODE 1SV101			
D102	8-719-800-09	DIODE 1SV101			
D103	8-719-800-09	DIODE 1SV101			
D201	8-719-903-07	DIODE GL-9NG24			
D203	8-719-815-55	DIODE 1S1555			
D204	8-719-815-55	DIODE 1S1555			

NOTE:

- Items with no part number and no description are not stocked because they are seldom required for routine service.
- Items marked " ♠ " are not stocked since thev are seldom required for routine service. Some delay should be anticipated when ordering these items.
- Due to standardization, parts with part numbers (Δ-ΔΔΔ-ΔΔΔ-XX or Δ-ΔΔΔΔ-ΔΔΔ-X) may be different from those used in the set.

CAPACITORS:

- All capacitors are in μF. Common capacitors are omitted. Refer to the following lists for their part numbers. MF:μF, PF:μμF.

RESISTORS

- All resistors are in ohms. Common 1/4W, 1/8W and 1/16W carbon resistors are omitted. Refer to the following lists for their part numbers.
- F : nonflammable

COILS

- MMH : mH, UH : μH

SEMICONDUCTORS

In each case, U : μ, for example:
UA···: μA···, UPA···: μPA···, UPC···: μPC,
UPD···: μPD···

ELECTRICAL PARTS

Ref.No.	Part No.	Description
D301	8-719-903-11	DIODE GL-9PR24
D302	8-719-815-55	DIODE 1S1555
D303	8-719-815-55	DIODE 1S1555
D401	8-719-902-79	DIODE KV1236Z2
D402	8-719-815-55	DIODE 1S1555
D403	8-719-815-55	DIODE 1S1555
D404	8-719-815-55	DIODE 1S1555
D405	8-719-815-55	DIODE 1S1555
D501	8-719-910-24	DIODE HZ12B1L
D502	8-719-200-02	DIODE 10E-2
D503	8-719-910-64	DIODE HZ6B1L
D504	8-719-815-55	DIODE 1S1555
D505	8-719-991-21	DIODE EQA01-12R1
D506	8-719-815-55	DIODE 1S1555
D507	8-719-815-55	DIODE 1S1555
D508	8-719-815-55	DIODE 1S1555
D601	8-719-815-55	DIODE 1S1555
D602	8-719-815-55	DIODE 1S1555
D603	8-719-815-55	DIODE 1S1555
D604	8-719-815-55	DIODE 1S1555
D605	8-719-815-55	DIODE 1S1555
D606	8-719-903-07	DIODE GL-9NG24
D607	8-719-815-55	DIODE 1S1555
D608	8-719-815-55	DIODE 1S1555
D609	8-719-815-55	DIODE 1S1555
D610	8-719-815-55	DIODE 1S1555
IC201	8-759-812-31	IC LA1231
IC301	8-759-833-90	IC LA3390
IC401	8-759-812-45	IC LA1245
IC601	8-759-201-03	IC TD6109P
IC602	8-759-201-02	IC TC9300F005
L101	♠;1-422-093-00	COIL, AIR-CORE
L102	♠;1-422-094-00	COIL, AIR-CORE
L103	♠;1-422-096-00	COIL, AIR-CORE
L104	♠;1-422-039-00	COIL, AIR-CORE
L105	♠;1-422-098-00	COIL, AIR-CORE
L106	♠;1-422-099-00	COIL, AIR-CORE
L301	1-408-421-21	MICRO INDUCTOR 100UH
L401	1-402-001-00	ANTENNA, FERRITE-ROD (MW)
L402	1-406-033-00	COIL (OSC)
L403	1-401-998-00	COIL (ANT)
L404	1-406-035-00	COIL (OSC)
L405	1-401-999-00	COIL (ANT)
L406	1-406-036-00	COIL (OSC)
L407	1-408-423-21	MICRO INDUCTOR 150UH
L408	1-408-429-21	MICRO INDUCTOR 470UH

ELECTRICAL PARTS

Ref.No.	Part No.	Description
LCD1	1-806-544-00	DISPLAY PANEL, LIQUID CRYSTAL
LPF1	1-235-164-00	FILTER, LOW PASS
LPF2	1-235-164-00	FILTER, LOW PASS
PL501	1-518-511-00	LAMP, PILOT
Q101	8-729-353-52	TRANSISTOR 2SC535
Q102	8-729-353-52	TRANSISTOR 2SC535
Q103	8-729-216-13	TRANSISTOR 2SK161
Q104	8-729-671-14	TRANSISTOR 2SC710-14
Q201	8-729-883-92	TRANSISTOR 2SC2839
Q202	8-729-663-47	TRANSISTOR 2SC1364
Q203	8-729-663-47	TRANSISTOR 2SC1364
Q501	8-729-288-02	TRANSISTOR 2SD880
Q502	8-729-663-47	TRANSISTOR 2SC1364
Q503	8-729-224-63	TRANSISTOR 2SK246-BL
Q601	8-729-663-47	TRANSISTOR 2SC1364
Q602	8-729-203-05	TRANSISTOR 2SK30A-GR3
Q603	8-729-665-47	TRANSISTOR 2SC1362
Q604	8-729-665-47	TRANSISTOR 2SC1362
Q605	8-729-663-47	TRANSISTOR 2SC1364
Q606	8-729-203-05	TRANSISTOR 2SK30A-GR3
Q607	8-729-665-47	TRANSISTOR 2SC1362
Q608	8-729-665-47	TRANSISTOR 2SC1362
Q609	8-729-663-47	TRANSISTOR 2SC1364
RT201	1-226-854-41	RES, ADJ, CARBON 100K
RT301	1-226-852-41	RES, ADJ, CARBON 22K
RT302	1-226-851-41	RES, ADJ, CARBON 10K
RT401	1-226-853-41	RES, ADJ, CARBON 47K
RT601	1-226-847-00	RES, ADJ, CARBON 1K
RT602	1-226-847-00	RES, ADJ, CARBON 1K
S1	1-554-267-00	SWITCH, ROTARY SLIDE
S6-1	1-552-412-00	SWITCH, KEY BOARD
S6-2	1-552-412-00	SWITCH, KEY BOARD
S6-3	1-552-412-00	SWITCH, KEY BOARD
S6-4	1-553-510-00	SWITCH, SLIDE
T201	1-404-419-00	COIL, DISCRIMINATOR
T401	1-404-413-00	TRANSFORMER, IF
XT601	1-527-995-00	VIBRATOR, CRYSTAL

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- F : nonflammable

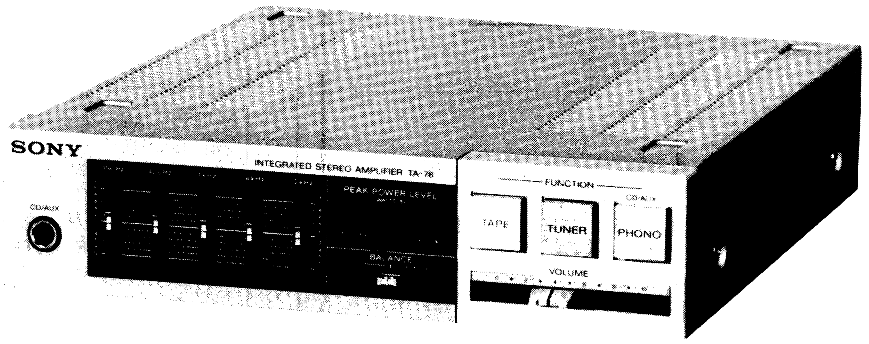
COILS

- MMH : mH, UH : μH

SEMICONDUCTORS

In each case, U : μ, for example:
UA···: μA···, UPA···: μPA···, UPC···: μPC, UPD···: μPD···

INTEGRATED STEREO AMPLIFIER
〔TA-78〕


SONY
INTEGRATED STEREO AMPLIFIER TA-78
CD/AUX
PEAK POWER LEVEL
BALANCE
FUNCTION
TAPE
TUNER
PHONO
VOLUME

Note: TA-78 is an integrated stereo amplifier in FH-7.

SONY®
SERVICE MANUAL

MICROFILM

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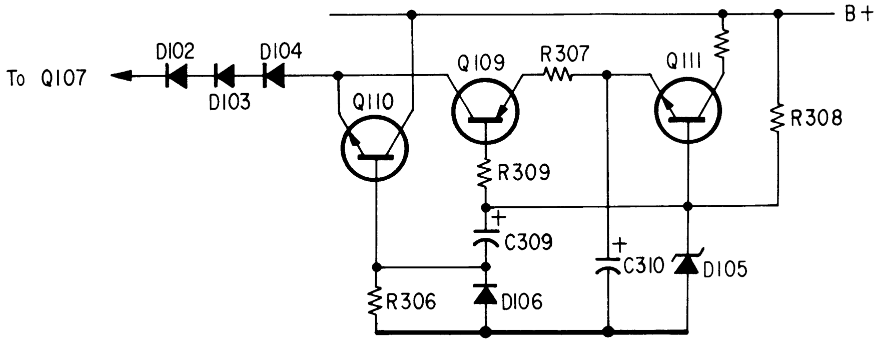
1. CIRCUIT DESCRIPTION

MUTING CIRCUIT

Q107 is a muting transistor.
It mutes output when the power switch is turned on and off or power voltage is much decreased.
When the power switch is ON:
Current flows on R308, C309 and R306, when the power switch is turned on.
Q110 is on until C309 finishes charging.
Q107 mutes output while Q110 is on.
When the power switch is off.
When Q109 base voltage is 0.6V lower than that of the emitter, Q109 is on.
Voltage charged to C310 is discharged through R307.
Then, Q107 turns on.

Power voltage fluctuation.

D105 is an 11V zener diode. Therefore, Q111 base voltage is 11V.
At this time, Q111 emitter voltage is 10.4V.
When power voltage decreases, and Q109 base voltage becomes 0.6V lower than that of the emitter, Q109 turns on.
Then Q107 mutes output.
When power voltage increased a little, Q110 turns ON.
Then Q107 turns ON and mutes output.


B+
To Q107
D102
D103
D104
Q110
Q109
R307
Q111
R308
R309
C309
R306
D106
C310
D105

Graphic EQ circuit

Fig. 1 shows a part of graphic EQ circuit redrawn for easy comprehension.
Graphic EQ circuit consists of C1, 2, R1, 2, Q1.
The output level of frequency band decreases when S1 is set to side ①, because certain frequency band of input signal passes through EQ circuit to the ground.
The output level of frequency band increases when S1 is set to side ②, because NF circuit is connected to the EQ circuit causing certain frequency band to pass through the EQ circuit to the ground.
The frequency band of this EQ circuit can be changed by changing the value of a capacitor.

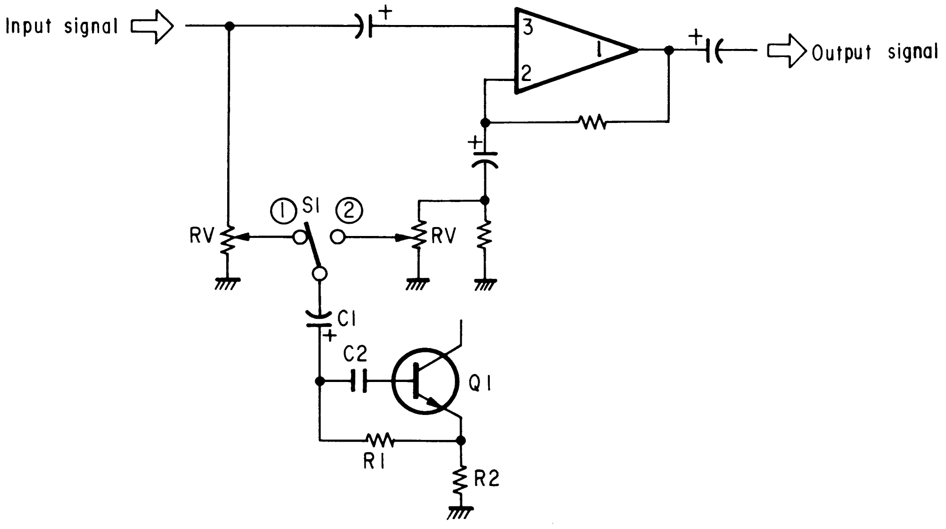
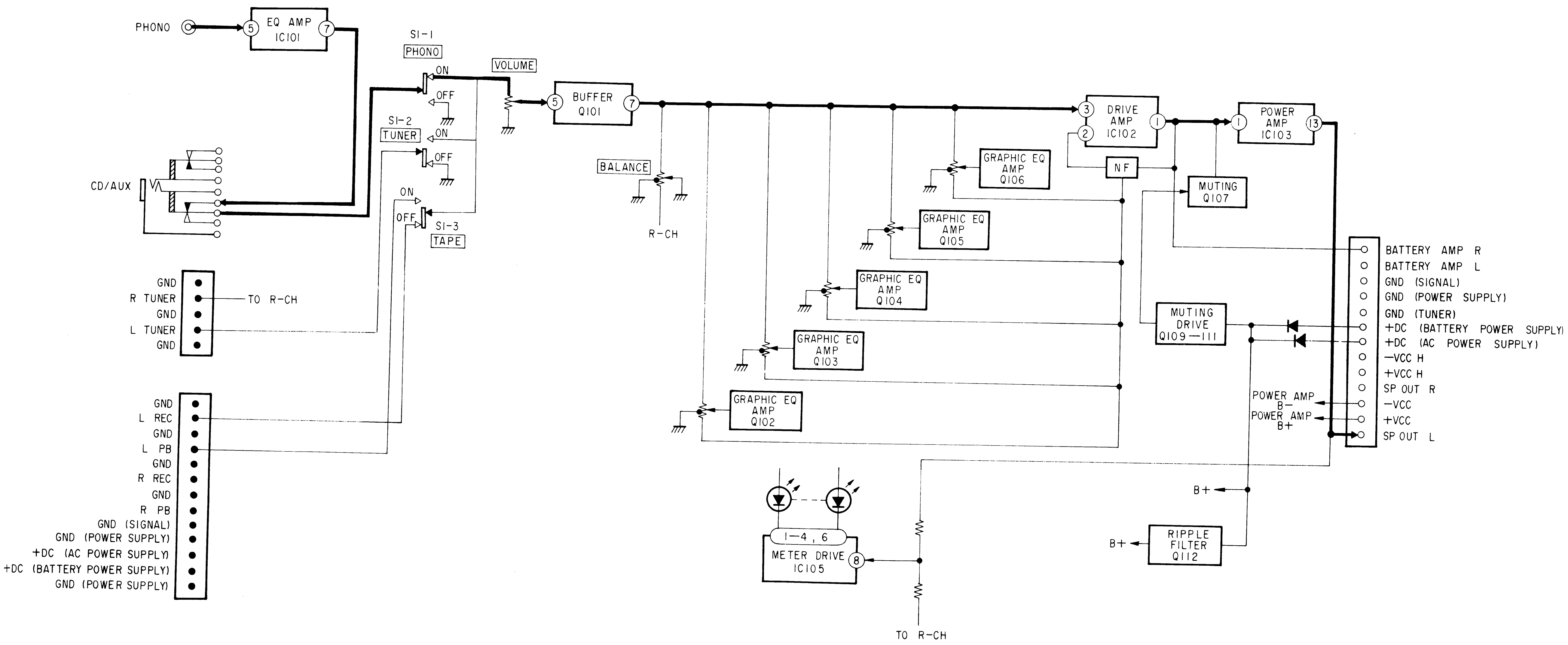

Input signal
Output signal
3
2
1
RV
① S1 ②
RV
C1
C2
Q1
R1
R2

Fig. 1

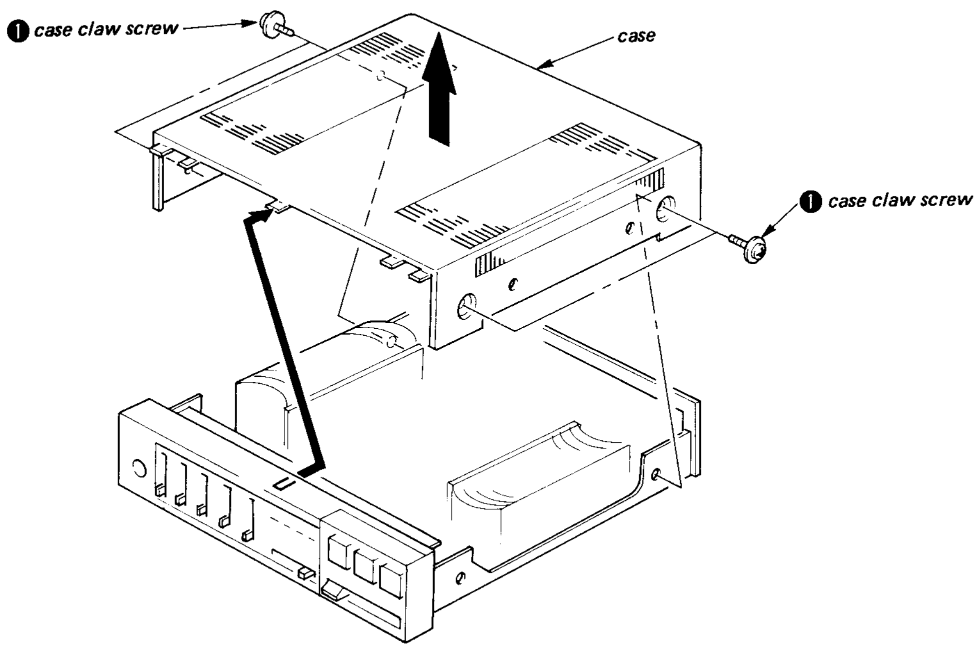
2. BLOCK DIAGRAM


PHONO
EQ AMP IC101
5
7
S1-1
PHONO
ON
OFF
VOLUME
BUFFER Q101
5
7
S1-2
TUNER
ON
OFF
ON
OFF
S1-3
TAPE
CD/AUX
BALANCE
R-CH
DRIVE AMP IC102
3
2
1
NF
POWER AMP IC103
1
13
MUTING Q107
GRAPHIC EQ AMP Q106
GRAPHIC EQ AMP Q105
GRAPHIC EQ AMP Q104
GRAPHIC EQ AMP Q103
GRAPHIC EQ AMP Q102
MUTING DRIVE Q109—111
GND
R TUNER
GND
L TUNER
GND
TO R-CH
GND
L REC
GND
L PB
GND
R REC
GND
R PB
GND (SIGNAL)
GND (POWER SUPPLY)
+DC (AC POWER SUPPLY)
+DC (BATTERY POWER SUPPLY)
GND (POWER SUPPLY)
BATTERY AMP R
BATTERY AMP L
GND (SIGNAL)
GND (POWER SUPPLY)
GND (TUNER)
+DC (BATTERY POWER SUPPLY)
+DC (AC POWER SUPPLY)
−VCC H
+VCC H
SP OUT R
−VCC
+VCC
SP OUT L
POWER AMP B−
POWER AMP B+
B+
B+
RIPPLE FILTER Q112
1—4, 6
METER DRIVE IC105
8
TO R-CH

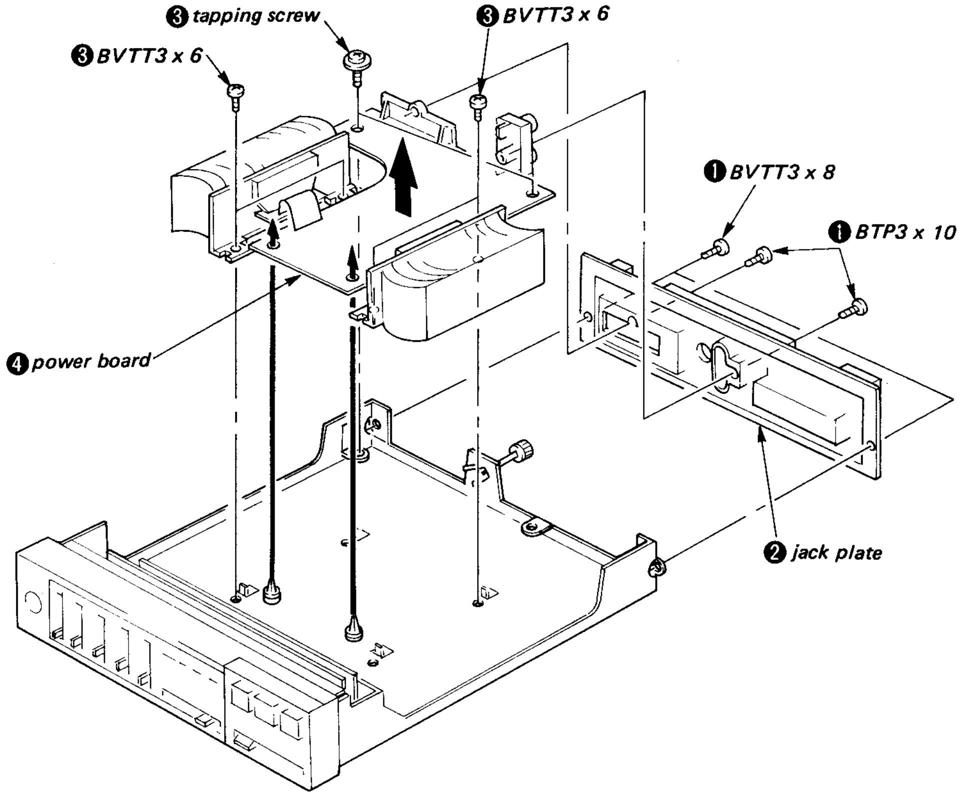
3. DISASSEMBLY

Note: Follow the disassembly procedure in the numerical order given.

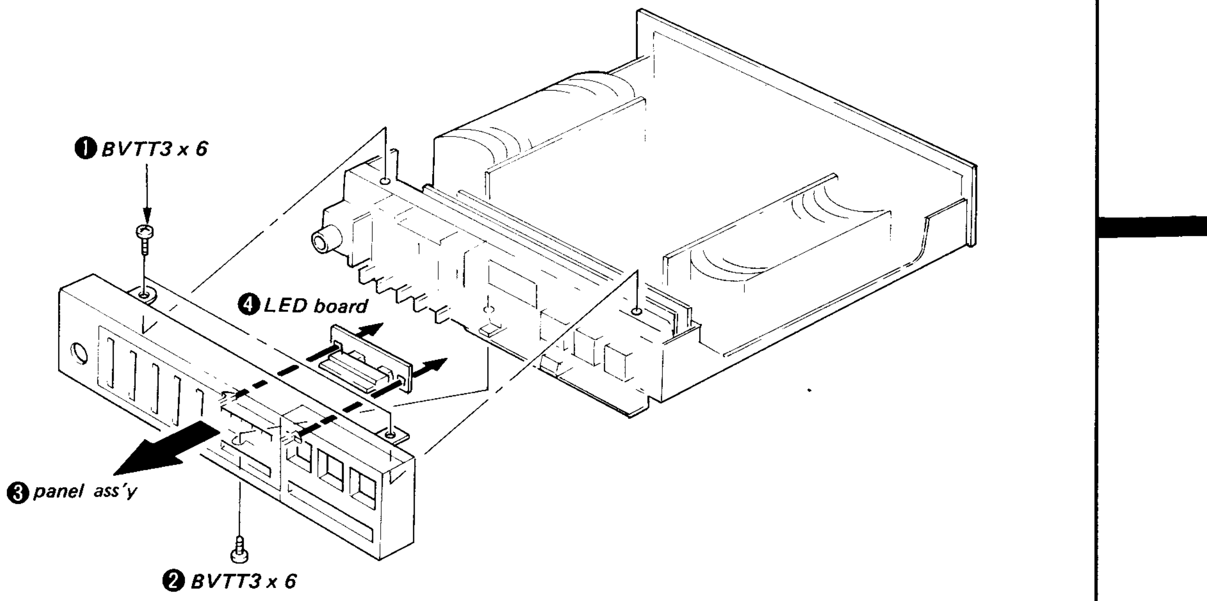
CASE


❶ case claw screw
case
❶ case claw screw

POWER BOARD


❸ tapping screw
❸ BVTT3 x 6
❸ BVTT3 x 6
❶ BVTT3 x 8
❶ BTP3 x 10
❹ power board
❷ jack plate

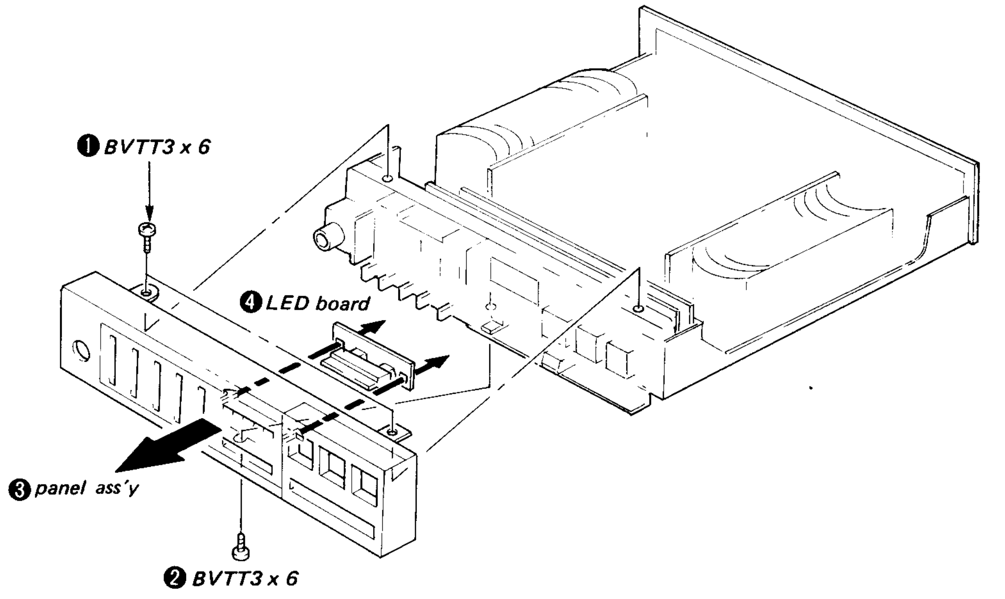
PANEL ASSEMBLY


❶ BVTT3 x 6
❹ LED board
❸ panel ass'y
❷ BVTT3 x 6

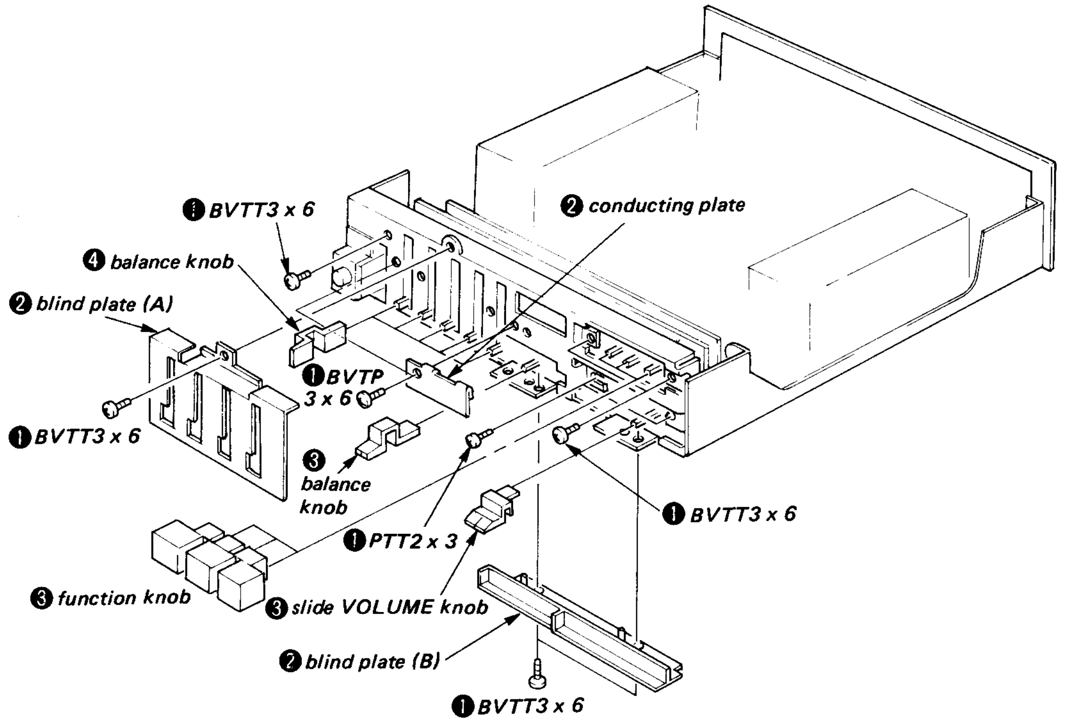
TO

TO

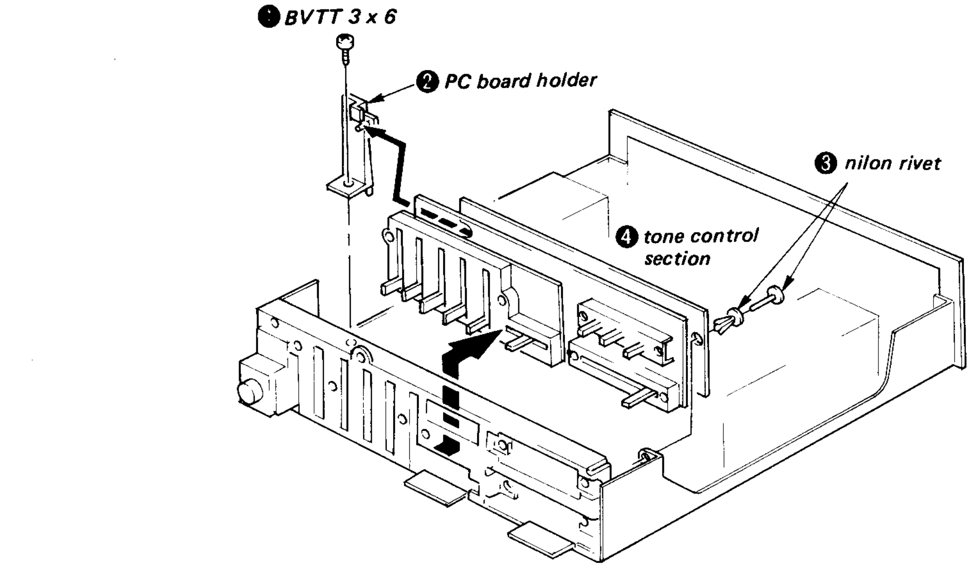
PANEL ASSEMBLY


❶BVTT3 x 6
❹LED board
❸panel ass'y
❷BVTT3 x 6

TONE CONTROL SECTION (1)


❶BVTT3 x 6
❷ conducting plate
❹ balance knob
❷ blind plate (A)
❶BVTP 3 x 6
❶BVTT3 x 6
❸ balance knob
❶BVTT3 x 6
❶PTT2 x 3
❸ function knob
❸ slide VOLUME knob
❷ blind plate (B)
❶BVTT3 x 6

TONE CONTROL SECTION (2)


❶BVTT 3 x 6
❷ PC board holder
❸ nilon rivet
❹ tone control section

4. MOUNTING DIAGRAM

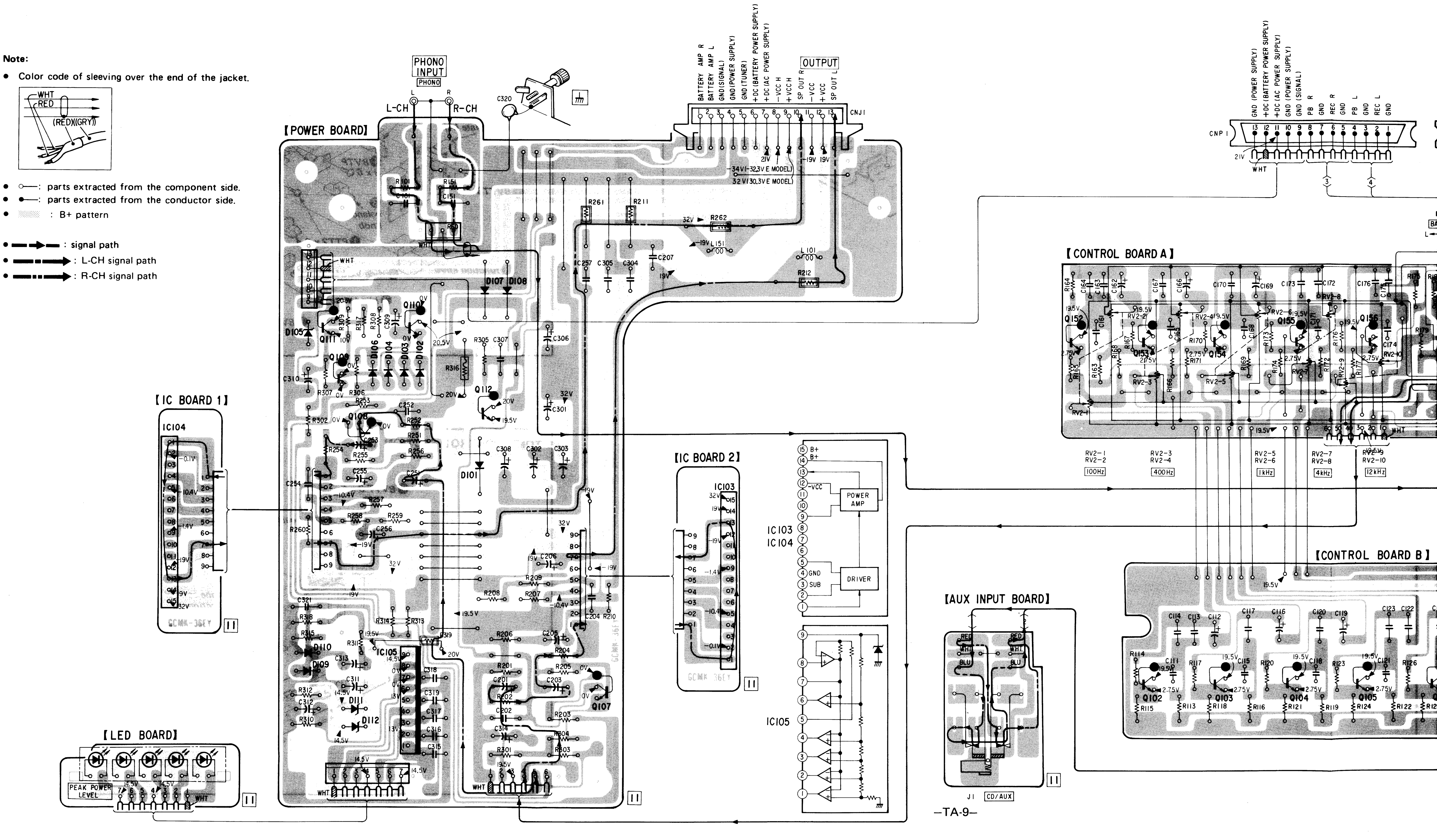
CAUTION ON VOLTAGE MEASUREMENT

When measuring voltages, be careful not to short the pins 9 and 10, 12 and 13 of CNJ1 in order to prevent IC103 from breakdown.

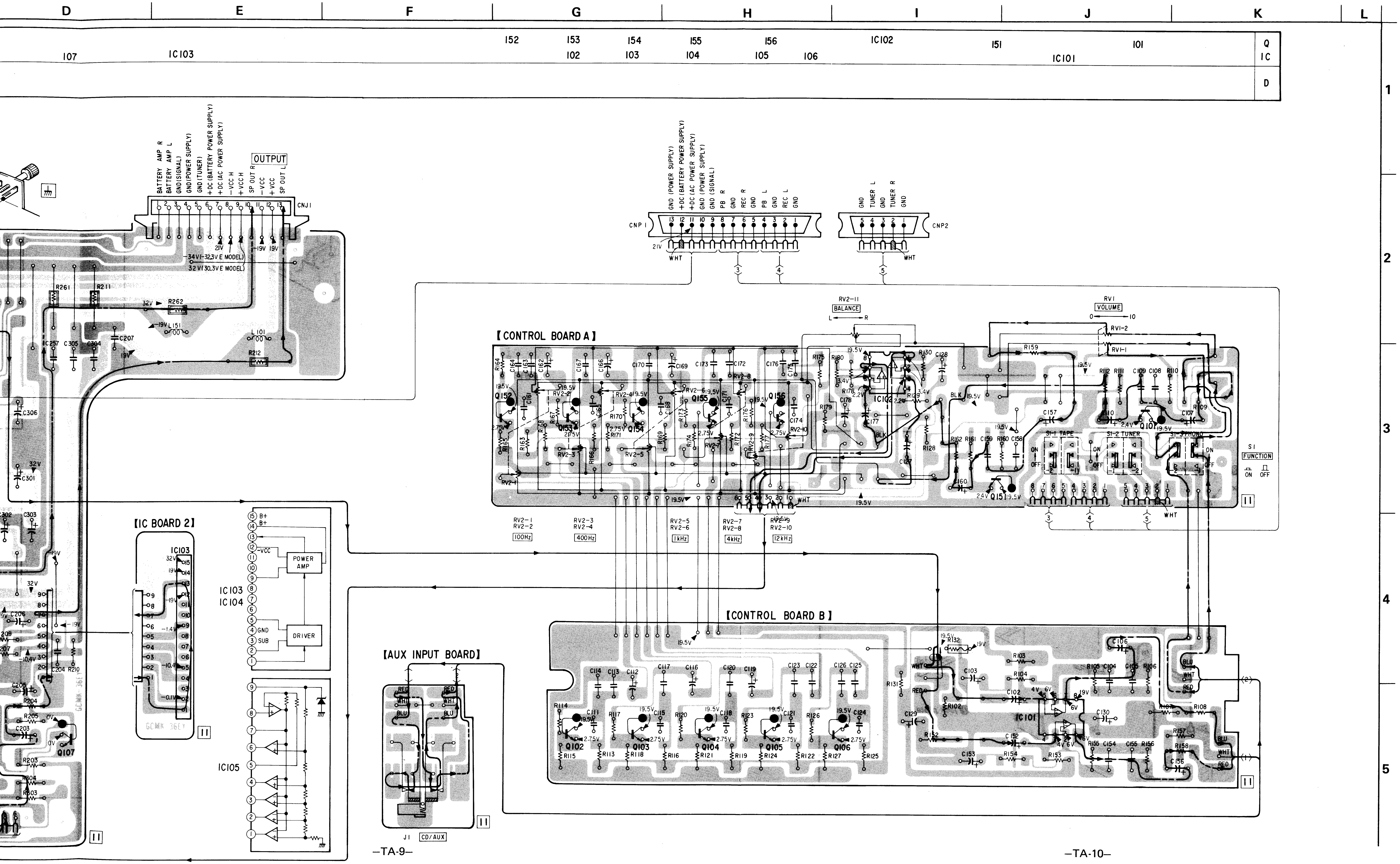
	A	B	C	D	E	F	G	H
Q			111 109 108 110 112				152 153 154	155 156
IC		IC104	IC105	107	IC103		102 103	104 105 106
D		105 110 109	106 104 103 102 111 112 107 108 101					

Note:

- Color code of sleeving over the end of the jacket.
- ○—: parts extracted from the component side.
- ●—: parts extracted from the conductor side.
- ▒ : B+ pattern
- ▬▬➡▬ : signal path
- ▬▬▬➡ : L-CH signal path
- ▬·▬·➡ : R-CH signal path


1
2
3
4
5
WHT
RED
(RED)(GRY)
PHONO INPUT
PHONO
L-CH
R-CH
C320
[POWER BOARD]
BATTERY AMP R
BATTERY AMP L
GND(SIGNAL)
GND(POWER SUPPLY)
GND(TUNER)
+DC(BATTERY POWER SUPPLY)
+DC(AC POWER SUPPLY)
−VCC H
+VCC H
SP OUT R
−VCC
+VCC
SP OUT L
OUTPUT
CNJ1
21V
−19V
19V
−34V(−32.3V E MODEL)
32V(30.3V E MODEL)
R261
R211
R262
32V
−19V
L151
L101
R212
C257
C305
C304
C207
R101
C101
R151
C151
D107
D108
Q110
Q111
Q109
Q108
Q112
Q107
D105
D106
D104
D103
D102
D101
D110
D109
D111
D112
20.5V
20V
19.5V
14.5V
13V
0V
[IC BOARD 1]
IC104
−0.1V
−10.4V
−1.4V
−19V
9V
32V
GCMK-36EY
[IC BOARD 2]
IC103
IC105
IC103
IC104
B+
B+
−VCC
POWER AMP
GND
SUB
DRIVER
[LED BOARD]
PEAK POWER LEVEL
[AUX INPUT BOARD]
RED
WHT
BLU
J1
CD/AUX
GND (POWER SUPPLY)
+DC (BATTERY POWER SUPPLY)
+DC (AC POWER SUPPLY)
GND (POWER SUPPLY)
GND (SIGNAL)
PB R
GND
REC R
GND
PB L
GND
REC L
GND
CNP1
21V
WHT
3
4
[CONTROL BOARD A]
Q152
Q153
Q154
Q155
Q156
RV2-1
RV2-2
RV2-3
RV2-4
RV2-5
RV2-6
RV2-7
RV2-8
RV2-9
RV2-10
100Hz
400Hz
1kHz
4kHz
12kHz
19.5V
2.75V
[CONTROL BOARD B]
Q102
Q103
Q104
Q105

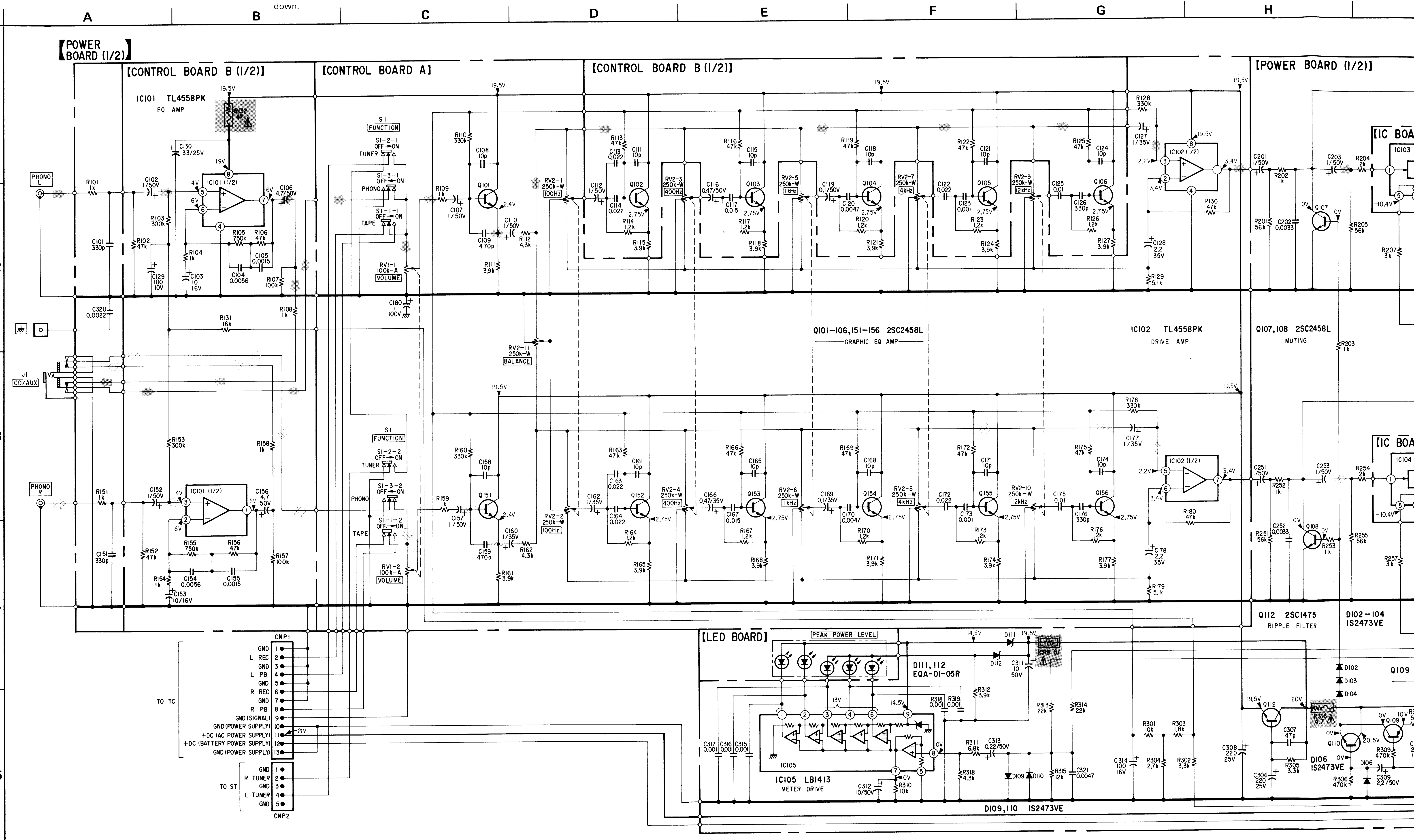
s 9 and
break-

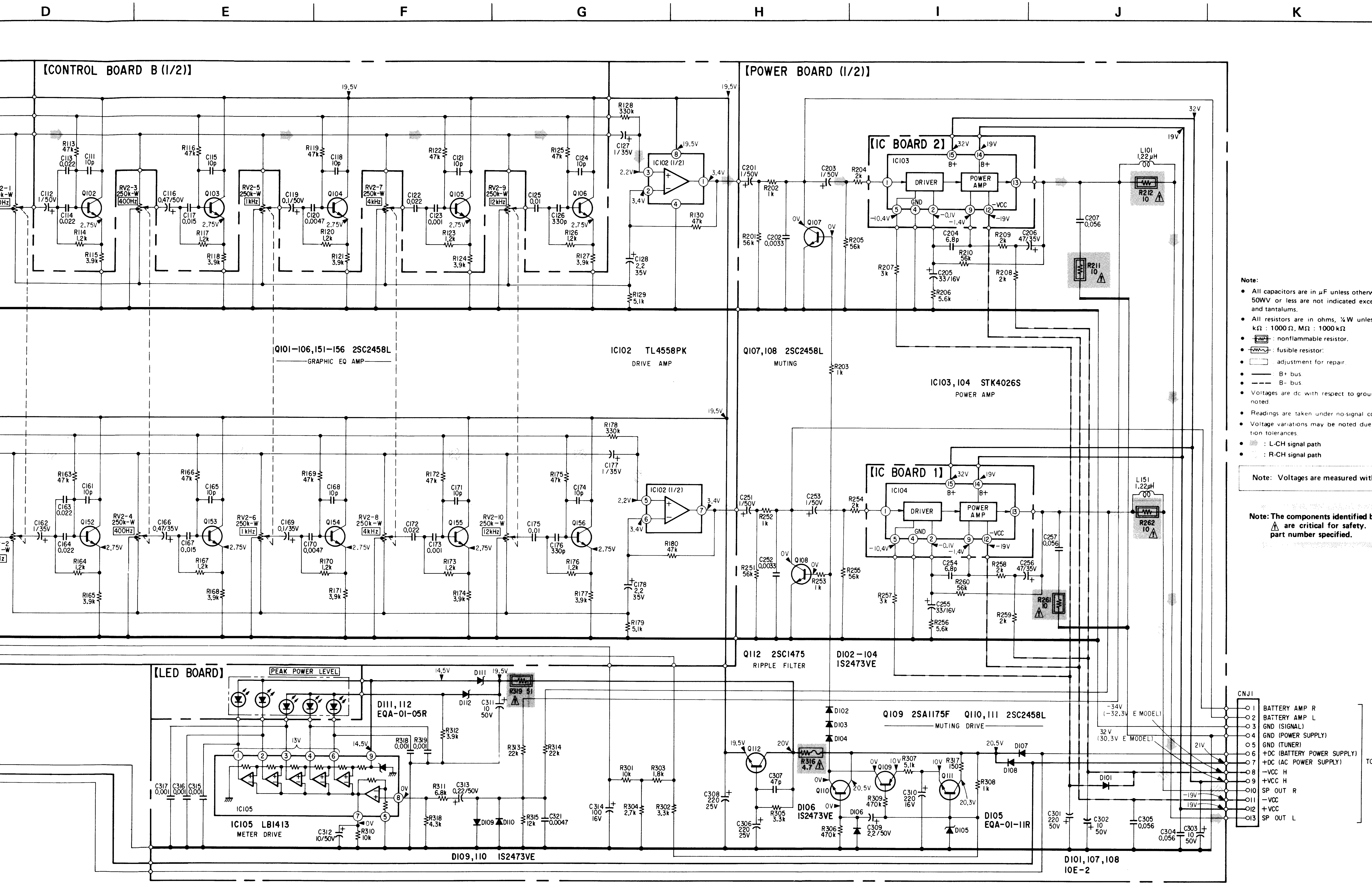

D
E
F
G
H
I
J
K
L
1
2
3
4
5
Q
IC
D
107
IC103
152
153
154
155
156
IC102
151
101
102
103
104
105
106
IC101
BATTERY AMP R
BATTERY AMP L
GND(SIGNAL)
GND(POWER SUPPLY)
GND(TUNER)
+DC(BATTERY POWER SUPPLY)
+DC(AC POWER SUPPLY)
−VCC H
+VCC H
SP OUT R
−VCC
+VCC
SP OUT L
OUTPUT
CNJ1
GND (POWER SUPPLY)
+DC (BATTERY POWER SUPPLY)
+DC (AC POWER SUPPLY)
GND (POWER SUPPLY)
GND (SIGNAL)
PB R
GND
REC R
GND
PB L
GND
REC L
GND
CNP1
TUNER L
TUNER R
CNP2
WHT
34V (32.3V E MODEL)
32V (30.3V E MODEL)
RV2-11
BALANCE
L R
RV1
VOLUME
0 10
[CONTROL BOARD A]
RV1-2
RV1-1
S1-1 TAPE
S1-2 TUNER
S1-3 PHONO
S1
FUNCTION
ON OFF
RV2-1
RV2-2
100Hz
RV2-3
RV2-4
400Hz
RV2-5
RV2-6
1kHz
RV2-7
RV2-8
4kHz
RV2-9
RV2-10
12kHz
[IC BOARD 2]
IC103
GCMK 36EY
IC103
IC104
B+
−VCC
POWER AMP
DRIVER
GND
SUB
IC105
[AUX INPUT BOARD]
RED
WHT
BLU
J1
CD/AUX
[CONTROL BOARD B]
IC101
Q102
Q103
Q104
Q105
Q106
Q107
Q151
Q152
Q153
Q154
Q155
Q156
Q101
BLK
19.5V
19V
32V
2.75V

5. SCHEMATIC DIAGRAM

CAUTION ON VOLTAGE MEASUREMENT

When measuring voltages, be careful not to short the pins 9 and 10, 12 and 13 of CNJ1 in order to prevent IC103 from breakdown.


A
B
C
D
E
F
G
H
[POWER BOARD (1/2)]
[CONTROL BOARD B (1/2)]
[CONTROL BOARD A]
[CONTROL BOARD B (1/2)]
[POWER BOARD (1/2)]
[IC BOA
IC101 TL4558PK
EQ AMP
IC101 (1/2)
PHONO L
PHONO R
J1 CD/AUX
S1 FUNCTION
S1-2-1 OFF ON TUNER
S1-3-1 OFF ON PHONO
S1-1-1 OFF ON TAPE
RV1-1 100k-A VOLUME
RV1-2 100k-A VOLUME
RV2-11 250k-W BALANCE
RV2-1 250k-W 100Hz
RV2-3 250k-W 400Hz
RV2-5 250k-W 1kHz
RV2-7 250k-W 4kHz
RV2-9 250k-W 12kHz
RV2-2 250k-W 100Hz
RV2-4 250k-W 400Hz
RV2-6 250k-W 1kHz
RV2-8 250k-W 4kHz
RV2-10 250k-W 12kHz
Q101-106, 151-156 2SC2458L
GRAPHIC EQ AMP
IC102 TL4558PK
DRIVE AMP
IC102 (1/2)
Q107, 108 2SC2458L
MUTING
Q112 2SC1475
RIPPLE FILTER
D102-104
1S2473VE
19.5V
R132 47
[LED BOARD]
PEAK POWER LEVEL
D111, 112
EQA-01-05R
IC105 LB1413
METER DRIVE
D109, 110 1S2473VE
D106 1S2473VE
R319 51
R316 4.7
CNP1
GND 1
L REC 2
GND 3
L PB 4
GND 5
R REC 6
GND 7
R PB 8
GND (SIGNAL) 9
GND (POWER SUPPLY) 10
+DC (AC POWER SUPPLY) 11
+DC (BATTERY POWER SUPPLY) 12
GND (POWER SUPPLY) 13
TO TC
21V
CNP2
GND 1
R TUNER 2
GND 3
L TUNER 4
GND 5
TO ST
IC103
IC104
Q109


D
E
F
G
H
I
J
K
L
1
2
3
4
5
【CONTROL BOARD B (1/2)】
【POWER BOARD (1/2)】
【IC BOARD 2】
【IC BOARD 1】
【LED BOARD】
PEAK POWER LEVEL
Q101–106,151–156 2SC2458L
GRAPHIC EQ AMP
IC102 TL4558PK
DRIVE AMP
Q107,108 2SC2458L
MUTING
IC103,104 STK4026S
POWER AMP
Q112 2SC1475
RIPPLE FILTER
D102–104
1S2473VE
Q109 2SA1175F Q110,111 2SC2458L
MUTING DRIVE
D105
EQA-01-11R
D106
1S2473VE
D111,112
EQA-01-05R
IC105 LB1413
METER DRIVE
D109,110 1S2473VE
D101,107,108
10E-2
RV2-3 250k-W 400Hz
RV2-5 250k-W 1kHz
RV2-7 250k-W 4kHz
RV2-9 250k-W 12kHz
RV2-4 250k-W 400Hz
RV2-6 250k-W 1kHz
RV2-8 250k-W 4kHz
RV2-10 250k-W 12kHz
IC102 (1/2)
IC102 (1/2)
IC103
IC104
DRIVER
POWER AMP
GND
B+
32V
19V
-VCC
-10.4V
-0.1V
-1.4V
-19V
19.5V
2.75V
2.2V
3.4V
L101 1.22μH
L151 1.22μH
R212 10
R211 10
R262 10
R261 10
R316 4.7
R319 51
-34V (-32.3V E MODEL)
32V (30.3V E MODEL)
21V
-19V
19V
CNJ1
1 BATTERY AMP R
2 BATTERY AMP L
3 GND (SIGNAL)
4 GND (POWER SUPPLY)
5 GND (TUNER)
6 +DC (BATTERY POWER SUPPLY)
7 +DC (AC POWER SUPPLY)
8 -VCC H
9 +VCC H
10 SP OUT R
11 -VCC
12 +VCC
13 SP OUT L
TO AC-78
C301 220 50V
C302 10 50V
C303 10 50V
C304 0.056
C305 0.056
D101
D107
D108

Note:

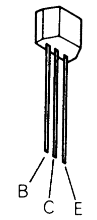
- All capacitors are in μF unless otherwise noted. pF : μμF 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in ohms, ¼W unless otherwise noted. kΩ : 1000 Ω, MΩ : 1000 kΩ
- ▭ : nonflammable resistor.
- ▭ : fusible resistor.
- ▭ : adjustment for repair.
- —— : B+ bus.
- – – – B- bus.
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken under no-signal conditions.
- Voltage variations may be noted due to normal production tolerances.
- ▨ : L-CH signal path
- ▭ : R-CH signal path

Note: Voltages are measured with a VOM (50kΩ/V).

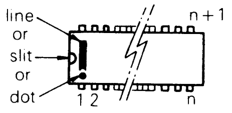
Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

SEMICONDUCTOR LEAD LAYOUTS

2SA1048
2SC2458

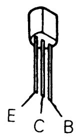


TL4558PK

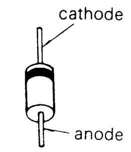

line
or
slit
or
dot
n+1
1 2
n

(Top view)

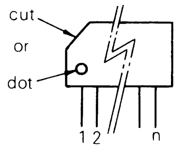
2SC1345
2SC1475



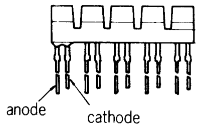
1S1555
10E2
EQA01-05R
EQA01-11R
EQB01-11Z


cathode
anode

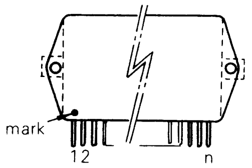
LB1413


cut
or
dot
1 2
n

SLP252B-06


anode
cathode

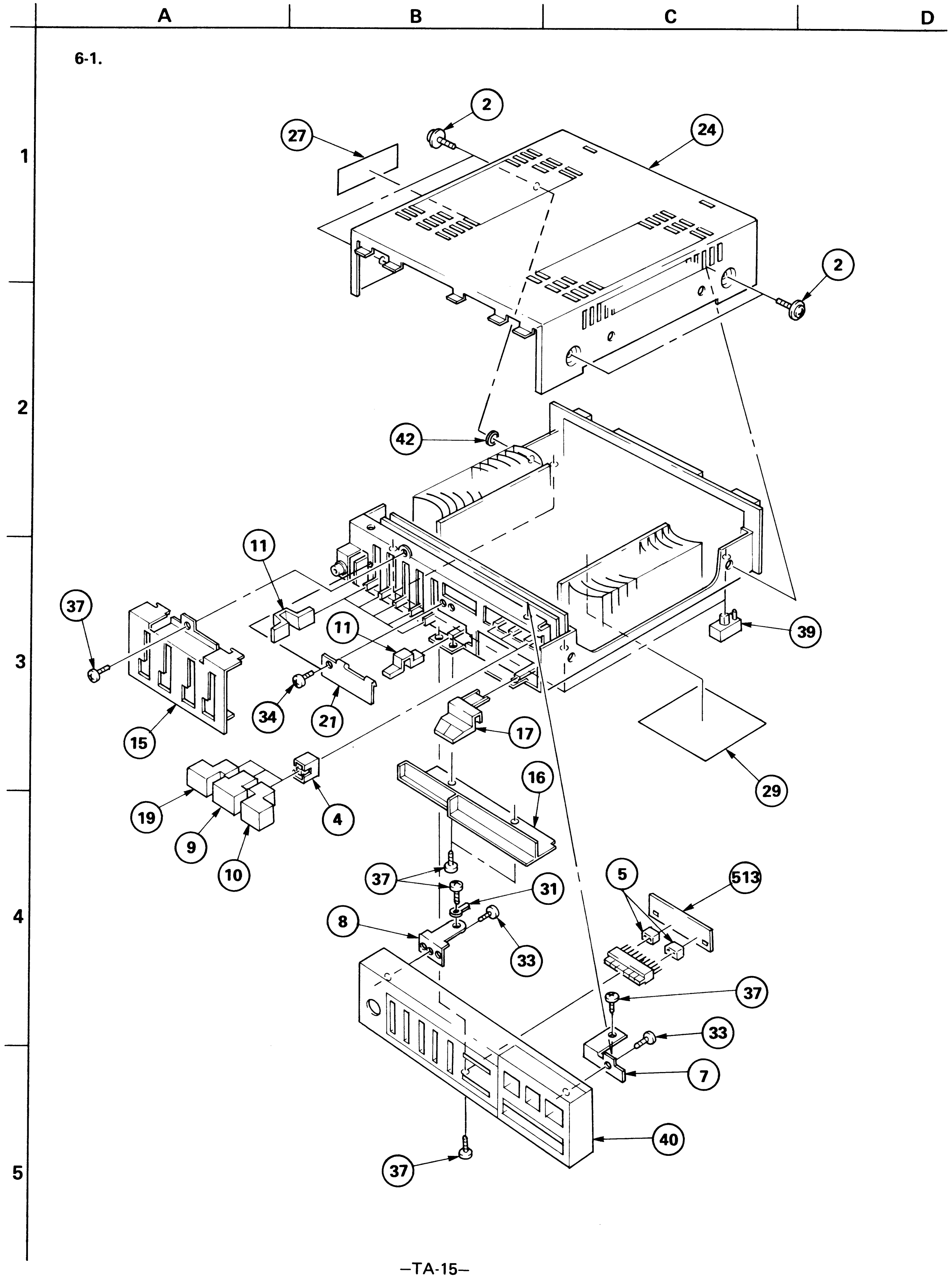
STK4026S



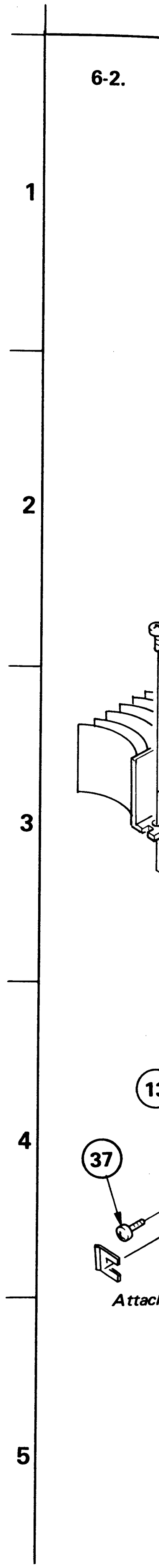
(Marking side view)

6. EXPLODED VIEWS AND PARTS LIST

6-1.

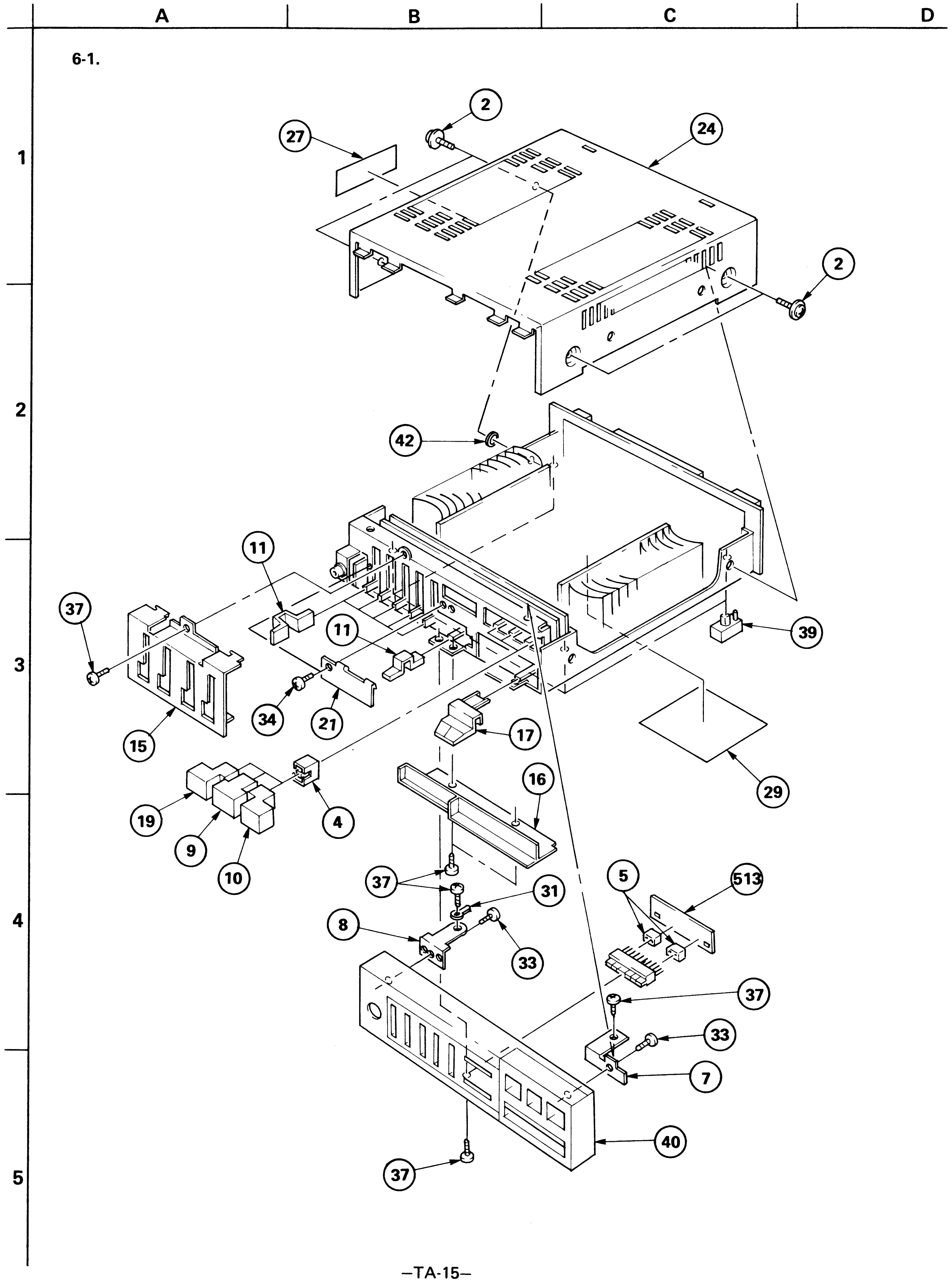

A
B
C
D
1
2
3
4
5
2
27
24
2
42
11
37
11
39
34
21
15
17
16
29
19
4
9
10
37
31
5
513
8
33
37
33
7
40
37

6-2.

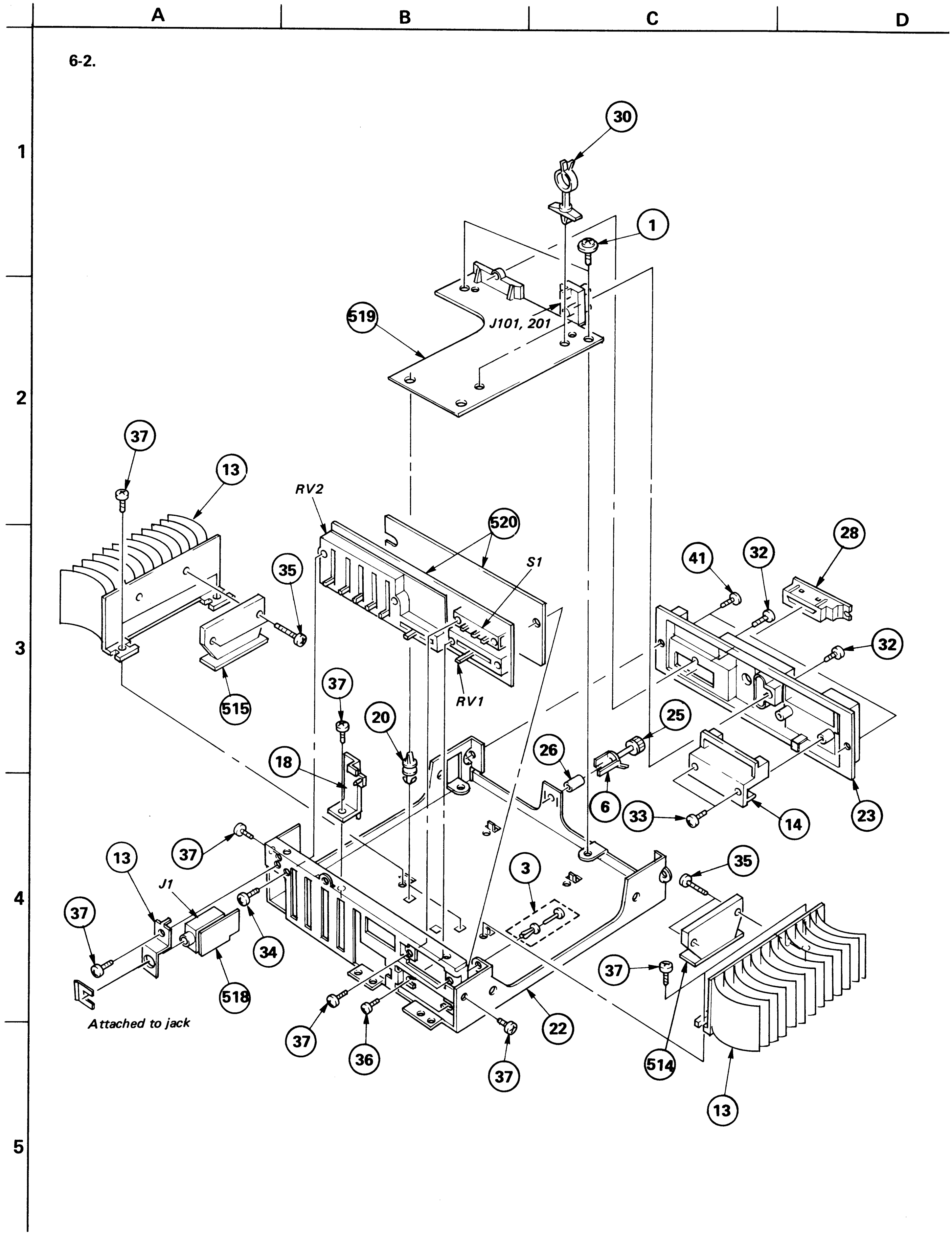

1
2
3
4
5
37
Attac

6. EXPLODED VIEWS AND PARTS LIST

6-1.


A
B
C
D
1
2
3
4
5
2
27
24
2
42
11
37
11
39
34
21
15
17
16
29
19
4
9
10
37
31
5
513
8
33
37
33
7
40
37

6-2.


A
B
C
D
1
2
3
4
5
30
1
519
J101, 201
37
13
RV2
520
S1
41
32
28
35
32
RV1
515
37
20
25
18
26
6
33
14
23
13
37
35
3
J1
37
34
Attached to jack
518
37
36
37
22
37
514
13

GENERAL SECTION

No.	Part No.	Description
1	3-701-589-00	SCREW, SELF-TAPPING
2	3-703-354-11	SCREW (OS), CASE, CLAW
3	4-812-134-00	RIVET NYLON, 3.5
4	4-864-307-00	RING
5	♠;4-881-653-00	SPACER, LED
6	♠;4-884-817-00	WASHER, TERMINAL
7	♠;4-884-819-00	BRACKET (A)
8	♠;4-884-820-00	BRACKET (B)
9	4-884-821-00	KNOB (16X16) (TUNER), SQUARE
10	4-884-822-00	KNOB (16X16) (PHONO), SQUARE
11	4-884-823-00	KNOB, BALANCE
12	♠;4-884-824-00	BRACKET, H.P
13	♠;4-884-825-00	HEAT SINK
14	♠;4-884-826-00	HOLDER (A), WIRE
15	♠;4-884-827-00	PLATE (A), BLIND
16	♠;4-884-828-00	PLATE (B), BLIND
17	4-884-829-00	KNOB, SLIDE VOLUME
18	♠;4-884-830-00	HOLDER (C), PC BOARD
19	4-884-831-00	KNOB (16X16) (TAPE), SQUARE
20	♠;4-884-834-00	SUPPORT, PC
21	♠;4-884-835-00	PLATE, CONDUCTING
22	♠;4-884-839-00	CHASSIS
23	4-884-840-00	PLATE, JACK
24	4-884-841-00	CASE
25	4-884-862-00	SCREW, GROUND
26	4-884-863-00	COLLAR
27	4-884-870-00	LABEL
28	4-884-874-00	COVER, CONNECTOR (A)
29	4-884-877-00	LABEL (PC BOARD REMOVAL)
30	4-884-882-00	CLAMP
31	7-623-508-01	LUG, 3
32	7-685-547-19	SCREW +BTP 3X10 TYPE2 N-S
33	7-685-646-11	SCREW +BVTP 3X8 TYPE2 N-S
34	7-685-645-11	SCREW +BVTP 3X6 TYPE2 SLIT
35	7-685-650-21	SCREW +BVTP 3X16 TYPE2 SLIT
36	7-685-780-01	SCREW +PTT 2X3 (S)
37	7-685-871-01	SCREW +BVTT 3X6 (S)
38	7-685-872-09	SCREW +BVTT 3X8 (S)
39	X-4884-801-0	FOOT ASSY, RUBBER
40	X-4884-811-2	PANEL ASSY
41	7-685-871-09	SCREW +BVTT 3X6
42	4-830-092-00	WASHER 4ϕ

ELECTRICAL PARTS

Ref.No.	Part No.	Description
501	1-535-422-00	PLATE, JUMPER
502	1-535-424-00	PLATE, JUMPER
503	1-562-067-00	SOCKET CONNECTOR 5P
504	1-535-426-00	PLATE, JUMPER
505	1-556-475-00	CORD (WITH CONNECTOR) 13P
506	1-556-476-00	CORD (WITH CONNECTOR) 5P
507	♠;1-561-439-00	SOCKET, CONNECTOR 3P
508	♠;1-561-441-00	SOCKET, CONNECTOR 5P
509	♠;1-561-442-00	SOCKET, CONNECTOR 6P
510	♠;1-561-443-00	SOCKET, CONNECTOR 7P
511	1-562-068-00	SOCKET, CONNECTOR 13P
512	1-608-440-00	PC BOARD, POWER
513	♠;1-608-441-00	PC BOARD, LED
514	♠;1-608-442-00	PC BOARD, IC (1)
515	♠;1-608-443-00	PC BOARD, IC (2)
516	1-608-450-00	PC BOARD, CONTROL (A)
517	1-608-451-00	PC BOARD, CONTROL (B)
518	♠;1-608-452-00	PC BOARD, AUX INPUT
519	♠;A-4351-327-A	MOUNTED PCB, POWER
520	♠;A-4375-167-A	MOUNTED PCB, CONTROL
D101	8-719-200-02	DIODE 10E-2
D102	8-719-815-55	DIODE 1S1555
D103	8-719-815-55	DIODE 1S1555
D104	8-719-815-55	DIODE 1S1555
D105	8-719-930-11	DIODE EQB01-11Z
D106	8-719-815-55	DIODE 1S1555
D107	8-719-200-02	DIODE 10E-2
D108	8-719-200-02	DIODE 10E-2
D109	8-719-815-55	DIODE 1S1555
D110	8-719-815-55	DIODE 1S1555
D111	8-719-936-05	DIODE EQA01-05R
D112	8-719-936-05	DIODE EQA01-05R
D301	8-719-925-26	DIODE SLP-252B
IC101	8-759-935-58	IC TL4558PK
IC102	8-759-935-58	IC TL4558PK
IC105	8-759-800-28	IC LB1413
IC103	8-749-940-26	IC STK4026S
IC104	8-749-940-26	IC STK4026S
L101	♠;1-420-872-00	COIL, AIR CORE
L151	♠;1-420-872-00	COIL, AIR CORE
J1	1-507-804-00	JACK, LARGE TYPE
J101	1-507-807-00	JACK, PIN 2P
J201	1-507-807-00	JACK, PIN 2P

NOTE:
- Items with no part number and no description are not stocked because they are seldom required for routine service.
- Items marked " ♠ " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- Due to standardization, parts with part numbers (Δ-ΔΔΔ-ΔΔΔ-XX or Δ-ΔΔΔΔ-ΔΔΔ-X) may be different from those used in the set.

CAPACITORS:
- All capacitors are in μF. Common capacitors are omitted. Refer to the following lists for their part numbers. MF:μF, PF:μμF.

RESISTORS
- All resistors are in ohms. Common 1/4W, 1/8W and 1/16W carbon resistors are omitted. Refer to the following lists for their part numbers.
- F : nonflammable

COILS
- MMH : mH, UH : μH

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

SEMICONDUCTORS
In each case, U : μ, for example:
UA···: μA···, UPA···: μPA···, UPC···: μPC,
UPD···: μPD···

ELECTRICAL PARTS

Ref.No.	Part No.	Description				
Q101	8-729-245-83	TRANSISTOR 2SC2458				
Q102	8-729-245-83	TRANSISTOR 2SC2458				
Q103	8-729-245-83	TRANSISTOR 2SC2458				
Q104	8-729-245-83	TRANSISTOR 2SC2458				
Q105	8-729-245-83	TRANSISTOR 2SC2458				
Q106	8-729-245-83	TRANSISTOR 2SC2458				
Q107	8-729-245-83	TRANSISTOR 2SC2458				
Q108	8-729-245-83	TRANSISTOR 2SC2458				
Q109	8-729-204-82	TRANSISTOR 2SA1048				
Q110	8-729-245-83	TRANSISTOR 2SC2458				
Q111	8-729-245-83	TRANSISTOR 2SC2458				
Q112	8-729-413-10	TRANSISTOR 2SC1475				
Q152	8-729-245-83	TRANSISTOR 2SC2458				
Q153	8-729-245-83	TRANSISTOR 2SC2458				
Q154	8-729-245-83	TRANSISTOR 2SC2458				
Q155	8-729-245-83	TRANSISTOR 2SC2458				
Q156	8-729-245-83	TRANSISTOR 2SC2458				
Q201	8-729-334-58	TRANSISTOR 2SC1345				
R132	⚠.1-212-873-00	FUSIBLE	47	5%	1/4W	F
R211	⚠.1-247-192-00	CARBON	10	5%	1/2W	F
R212	⚠.1-247-192-00	CARBON	10	5%	1/2W	F
R261	⚠.1-247-192-00	CARBON	10	5%	1/2W	F
R262	⚠.1-247-192-00	CARBON	10	5%	1/2W	F
R316	⚠.1-212-849-00	FUSIBLE	4.7	5%	1/4W	F
R319	⚠·1-247-209-00	CARBON	51	5%	1/2W	F
RV1	1-228-777-00	RES, VAR, SLIDE 100K/100K				
RV2	1-228-778-00	RES, VAR, SLIDE (BLOCK TYPE)				
S1	1-554-268-00	SWITCH, PUSH (3 KEY)				

NOTE:
- Items with no part number and no description are not stocked because they are seldom required for routine service.
- Items marked " ♦ " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- Due to standardization, parts with part numbers (Δ-ΔΔΔ-ΔΔΔ-XX or Δ-ΔΔΔΔ-ΔΔΔ-X) may be different from those used in the set.

CAPACITORS:
- All capacitors are in μF. Common capacitors are omitted. Refer to the following lists for their part numbers. MF:μF, PF:μμF.

RESISTORS
- All resistors are in ohms. Common 1/4W, 1/8W and 1/16W carbon resistors are omitted. Refer to the following lists for their part numbers.
- F : nonflammable

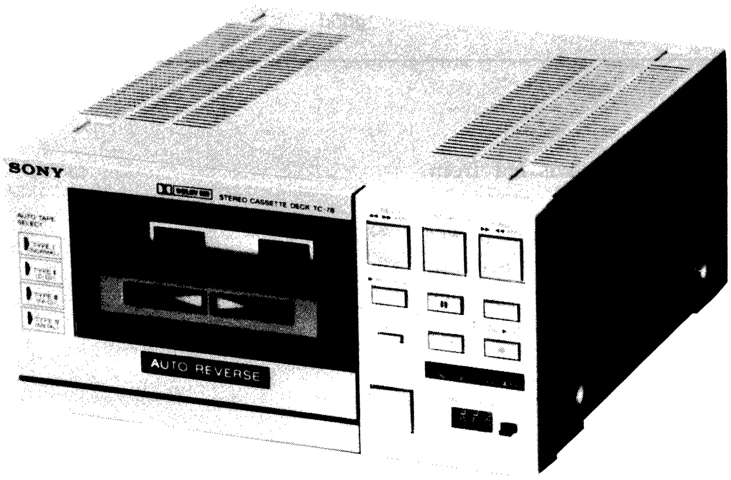
COILS
- MMH : mH, UH : μH

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

SEMICONDUCTORS
In each case, U : μ, for example:
UA···: μA···, UPA···: μPA···, UPC···: μPC, UPD···: μPD···

CASSETTE DECK

〔TC-78〕


SONY
STEREO CASSETTE DECK TC-78
AUTO TAPE SELECT
AUTO REVERSE

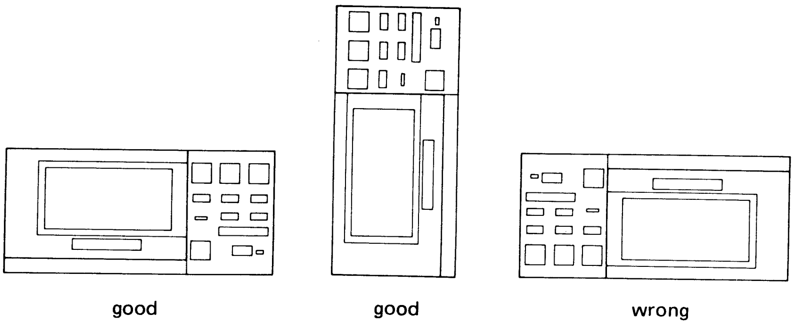
Note: TC-78 is a stereo cassette deck unit in FH-7.

Tape Transport Mechanism Type	TCM-130R2

SERVICING NOTE

NOTES ON REPAIR

When the mech deck is operated with the set in an upside-down position, misoperation may result. For repair while operating the mech deck, perform with the set in its normal position or standing on its side.

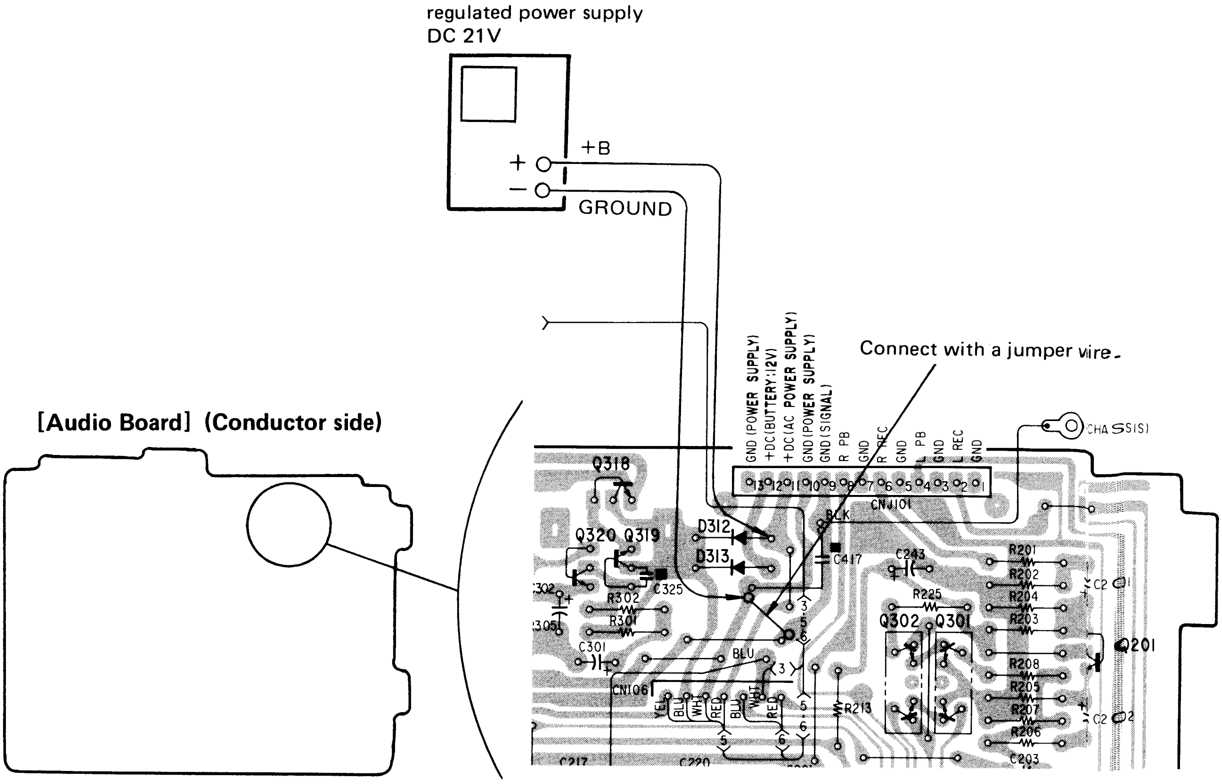

good
good
wrong

[To apply B+ voltage in repair]

The power supply voltage of this unit is fed from AC-78 via TA-78.

There are two ground lines for signal and power supply circuits, which are not connected in this unit. When this unit alone operates, connect the two ground lines with a jumper wire and a regulated power supply as illustrated.

After repairing, remove the jumper wire connected.


regulated power supply
DC 21V
+
−
+B
GROUND
[Audio Board] (Conductor side)
Connect with a jumper wire.
GND (POWER SUPPLY)
+DC(BUTTERY:12V)
+DC(AC POWER SUPPLY)
GND(POWER SUPPLY)
GND(SIGNAL)
R PB
GND
R REC
GND
L PB
GND
L REC
GND
CNJ101
(CHASSIS)
BLK
Q318
Q320
Q319
D312
D313
C325
R302
R301
C301
C417
C243
R225
Q302
Q301
R201
R202
R204
R203
R208
R205
R207
R206
C203
C201
C202
Q201
R213
CN106
YEL
BLU
WHT
RED
BLU
WHT
RED
BLU
3
5
6

SECTION 1
CIRCUIT DESCRIPTION

1-1. C-MOS MECHANISM CONTROLLER TC9310N-001 (IC401)

* See page 3, 4 for MOS IC

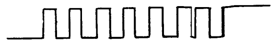
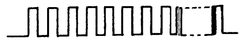
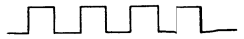
(1) OUTLINE

This IC electrically controls the mechanism of this set. This IC puts out the required output signals in accordance with the switched-in commanding input signals with predetermined processing timings.
This IC consists mainly of the following six blocks.

1. Input Circuits:
   The input circuits eliminate chattering of the input signals, determine the priority of input switches and then latch the operational or desired mode.
2. Control Circuits:
   The control circuits generate signals to control the timer operation, automatic music-selection (AMS) operation, automatic operation, reset operation, etc.
3. LED-Drive Circuits:
   This circuits put out the drive signals to LED indicate the mode specified by items 1, 2.
4. Timing Circuits:
   This circuit makes the switching periods of the output signals in good timings everytime a mode is changed to another one specified by items 1, 2.
5. Solenoid and Motor-Drive Output Circuits:
   These circuits put out signals to operate the mechanism of the deck. The circuits connect to the solenoid-and motor-drive circuits.
6. Muting Signal Output Circuits:
   These circuits connect to the amplifier circuits for the elimination of noise and selection of audio-signal system.

(2) FUNCTION OF EACH TERMINAL

Terminal No.	Name	Function
1.	GND	Grounding terminal of power supply.
2.	OSC	Clock OSC terminal. (approx. 9kHz in this set.)
3.	$\overline{\text{RESET}}$ (INPUT)	Signal input to put all of the operation of the set into the initial state.
4.	$\overline{\text{FAST REVERSE}}$ (INPUT)	Signal input to commande the mechanism to Fast-Foward mode of REVERSE direction.
5.	$\overline{\text{REV}}$ (INPUT)	Signal input to command the mechanism to playback the tape of REVERSE direction. This terminal becomes in AMS operation when this terminal is put into "L" together with FF or $\overline{\text{FAST-REVERSE}}$ input simultaneously.
6.	$\overline{\text{STOP}}$ (INPUT)	Signal input to release a mode designated by other input switches.
7.	$\overline{\text{FWD}}$ (INPUT)	Signal input to command the mechanism to playback the tape. This terminal becomes in record-mode command signal when this terminal is put into "L" together with REC-signal input at the same time. This terminal becomes in AMS operation when this terminal is put into "L" together with $\overline{\text{FF}}$ or $\overline{\text{FAST-REVERSE}}$ input simultaneously. This terminal becomes in the commanding signal to put the set in auto play when this terminal becomes in "L" together with $\overline{\text{FAST-REVERSE}}$ input simultaneously.
8.	$\overline{\text{FF}}$ (INPUT)	Signal input to command the mechanism to set in fast-forward mode.
9.	$\overline{\text{PAUSE}}$ (INPUT)	Command-signal input to make the set in stop operation temporarily, i.e., pause, or restart operation during play-back and record mode. This is of a self-set and self-reset type. This terminal is reset when the mode is in fast-forward or fast-reverse and $\overline{\text{STOP}}$ and $\overline{\text{REC MUTE}}$ signals are in "L". In other conditions, this terminal can be reset or set. In auto-space operation, this terminal is command-signal input to release record-muting mode in case $\overline{\text{REC MUTE}}$ is in "H".

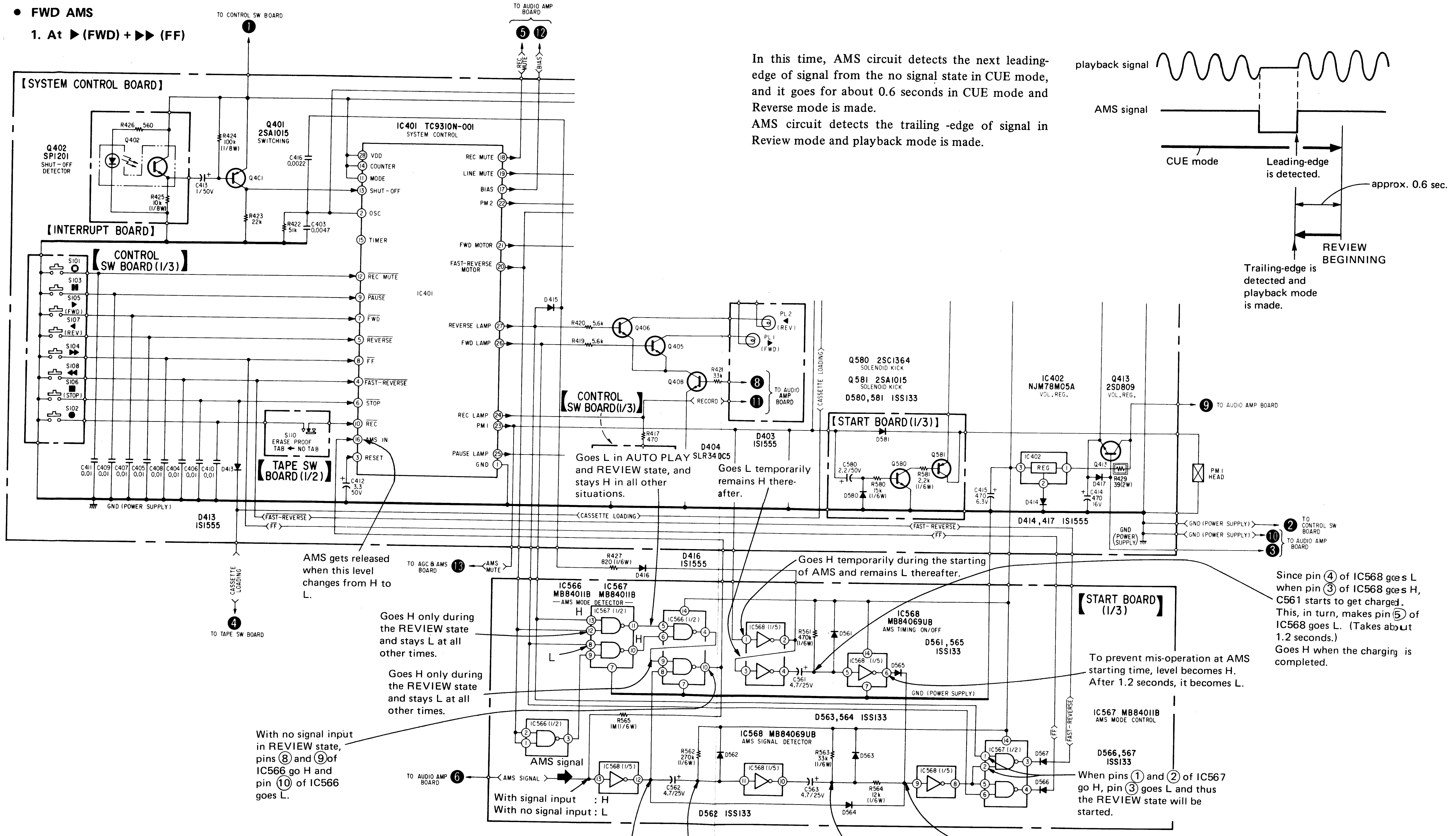
Terminal No.	Name	Function
10.	$\overline{\text{REC}}$ (INPUT)	Signal input to command the set to become in record-monitor mode. This input is disabled when the set is in fast-forward or fast-reverse and $\overline{\text{STOP}}$ input is in "L".
11.	$\overline{\text{REC MUTE}}$ (INPUT)	Command-signal input to mute record signal and effective only in record and record pause modes. When this signal is in "L", pause operation is reset. Muting operation is maintained for four seconds after disappearance of this signal (auto-space operation). Auto-space operation is released on receipt of $\overline{\text{PAUSE}}$ input in "L" when this input is in "H".
12.	MODE (INPUT)	MODE select input Open: Relay style FWD direction L: Slide switch style FWD direction H: FWD/REV directions
13.	$\overline{\text{SHUT OFF}}$ (INPUT)	Input of tape-travel detection. Pulse signal is put into this terminal during forward, fast forward, rewind and record modes. In forward and record modes, the mechanism shuts off and becomes in stop mode in two seconds after the stoppage of tape travel, i.e., stop of pulse. In fast-forward and fast-reverse modes, the mechanism shuts off and becomes in stop mode one second after the stoppage of tape travel likewise.
14.	$\overline{\text{COUNTER}}$ (INPUT)	Commanding-signal input to stop the mechanism or to put the set into forward mode during rewind mode. Forward mode is made when $\overline{\text{FAST-REVERSE}}$ and $\overline{\text{FORWARD}}$ switches are pressed at the same time. In other modes than rewind, this signal is not accepted. Also this signal is not accepted even in rewind mode when $\overline{\text{FAST-REVERSE}}$ switch is kept pressed. This terminal is not used on TC-78.
15.	$\overline{\text{TIMER}}$ (OUTPUT)	Puts out "L" signal for only 0.5 second after four-second resetting.
16.	$\overline{\text{AMS}}$ (INPUT)	Signal input to put the set into AMS operation. AMS mode is made when this signal is in "L".
17.	BIAS (OUTPUT)	Puts out "H" signal in record and record-muting modes. Otherwise; L
18.	REC MUTE (OUTPUT)	Record mode: L Otherwise: H
19.	LINE MUTE (OUTPUT)	Puts out "H" signal in playback (▶, ◀ direction), record, record-monitor, record-pause and record-muting modes. Line muting is off with this signal in "H", Otherwise ; L.
20.	FAST-REVERSE MOTOR (OUTPUT)	Puts out "H" signal in fast-reverse (◀◀), auto-play AMS (▶+ ◀◀, ◀ + ◀◀) and rewind mode in AMS (▶ + ▶▶). Otherwise; L
21.	FWD MOTOR (OUTPUT)	Puts out "H" signal in playback (▶, ◀ direction), record, record-muting, FF, AMS (▶+ ▶▶ , ◀+ ◀◀) modes and rewind mode in AMS (◀ + ◀◀). Otherwise; L
22.	PM2 (OUTPUT)	Puts out "H" signal in pause at FF (▶▶) and AMS modes. Momentarily puts out "H" signal in REV (◀) mode. Otherwise; L.
23.	PM1 (OUTPUT)	Puts out "H" signal in playback (▶, ◀ direction), record, record-muting modes. Momentarily puts out "H" signal in AMS mode. Otherwise; L.
24.	REC LAMP (OUTPUT)	Puts out "H" signal in record, record-monitor, record-pause and record-muting modes. Otherwise; L.
25.	PAUSE LAMP (OUTPUT)	Puts out "H" signal in pause mode. Puts out "H" and "L" signals alternately during record muting and during reset mode in record-muting (Auto space)  more than four seconds  in reset 
26.	FWD LAMP (OUTPUT)	Puts out "H" signal in FWD (▶ direction), forward pause, record, record-pause, auto play and AMS (▶ + ▶▶ , ▶ + ◀◀ direction) modes. Otherwise; L
27.	REVERSE LAMP (OUTPUT)	Puts out "H" signal in reverse playback (◀ direction), playback-pause and reverse AMS (◀ + ▶▶ , ◀+ ◀◀ direction modes. Otherwise; L
28.	VDD	5V power source terminal.

1-2. AMS CIRCUIT

• FWD AMS

1. At ▶ (FWD) + ▶▶ (FF)

In this time, AMS circuit detects the next leading-edge of signal from the no signal state in CUE mode, and it goes for about 0.6 seconds in CUE mode and Reverse mode is made.
AMS circuit detects the trailing -edge of signal in Review mode and playback mode is made.


playback signal
AMS signal
CUE mode
Leading-edge is detected.
approx. 0.6 sec.
REVIEW BEGINNING
Trailing-edge is detected and playback mode is made.
TO CONTROL SW BOARD
TO AUDIO AMP BOARD
REC MUTE
BIAS
[SYSTEM CONTROL BOARD]
[INTERRUPT BOARD]
Q402 SPI201 SHUT-OFF DETECTOR
R426 560
R424 100k (1/8W)
Q401 2SA1015 SWITCHING
C413 1/50V
R425 10k (1/8W)
R423 22k
R422 51k
C403 0.0047
C416 0.0022
IC401 TC9310N-001 SYSTEM CONTROL
VDD
COUNTER
MODE
SHUT-OFF
OSC
TIMER
REC MUTE
LINE MUTE
BIAS
PM 2
FWD MOTOR
FAST-REVERSE MOTOR
REVERSE LAMP
FWD LAMP
REC LAMP
PM I
PAUSE LAMP
GND
[CONTROL SW BOARD (1/3)]
S101 S103 S105 (FWD) S107 (REV) S104 S108 S106 (STOP) S102
REC MUTE
PAUSE
FWD
REVERSE
FF
FAST-REVERSE
STOP
REC
AMS IN
RESET
S110 ERASE PROOF TAB ← NO TAB
[TAPE SW BOARD (1/2)]
C412 3.3 50V
C411 C409 C407 C405 C408 C404 C406 C410 0.01
D413
GND (POWER SUPPLY)
D413 1S1555
FAST-REVERSE
FF
CASSETTE LOADING
TO TAPE SW BOARD
D415
R420 5.6k
R419 5.6k
Q406
Q405
Q408
R421 33k
PL2 (REV)
PL1 (FWD)
TO AUDIO AMP BOARD
RECORD
[CONTROL SW BOARD (1/3)]
R417 470
D404 SLR34DC5
D403 1S1555
Q580 2SC1364 SOLENOID KICK
Q581 2SA1015 SOLENOID KICK
D580,581 1SS133
[START BOARD (1/3)]
D581
C580 2.2/50V
R580 15k (1/6W)
R581 2.2k (1/6W)
IC402 NJM78M05A VOL. REG.
Q413 2SD809 VOL. REG.
REG
C415 470 6.3V
D414
D417
C414 470 16V
R429 39(2W)
D414,417 1S1555
PM I HEAD
GND (POWER SUPPLY)
TO CONTROL SW BOARD
TO AUDIO AMP BOARD
TO AGC & AMS BOARD
AMS MUTE
R427 820 (1/6W)
D416 1S1555
IC566 IC567 MB84011B MB84011B —AMS MODE DETECTOR—
IC567 (1/2)
IC566 (1/2)
IC568 (1/5)
R561 470k (1/6W)
D561
IC568 MB84069UB AMS TIMING ON/OFF
D561,565 1SS133
C561 4.7/25V
D565
GND (POWER SUPPLY)
[START BOARD (1/3)]
IC567 MB84011B AMS MODE CONTROL
D566,567 1SS133
D567
D566
R565 1M (1/6W)
D563,564 1SS133
IC568 MB84069UB AMS SIGNAL DETECTOR
R562 270k (1/6W)
D562
R563 33k (1/6W)
D563
C562 4.7/25V
C563 4.7/25V
R564 12k (1/6W)
D564
D562 1SS133
TO AUDIO AMP BOARD
AMS SIGNAL
H
L

AMS gets released when this level changes from H to L.

Goes L in AUTO PLAY and REVIEW state, and stays H in all other situations.

Goes L temporarily remains H thereafter.

Goes H temporarily during the starting of AMS and remains L thereafter.

Since pin ④ of IC568 goes L when pin ③ of IC568 goes H, C561 starts to get charged. This, in turn, makes pin ⑤ of IC568 goes L. (Takes about 1.2 seconds.)
Goes H when the charging is completed.

Goes H only during the REVIEW state and stays L at all other times.

Goes H only during the REVIEW state and stays L at all other times.

To prevent mis-operation at AMS starting time, level becomes H. After 1.2 seconds, it becomes L.

With no signal input in REVIEW state, pins ⑧ and ⑨ of IC566 go H and pin ⑩ of IC566 goes L.

AMS signal

With signal input : H
With no signal input : L

When pins ① and ② of IC567 go H, pin ③ goes L and thus the REVIEW state will be started.

With signal input : L
With no signal input : H

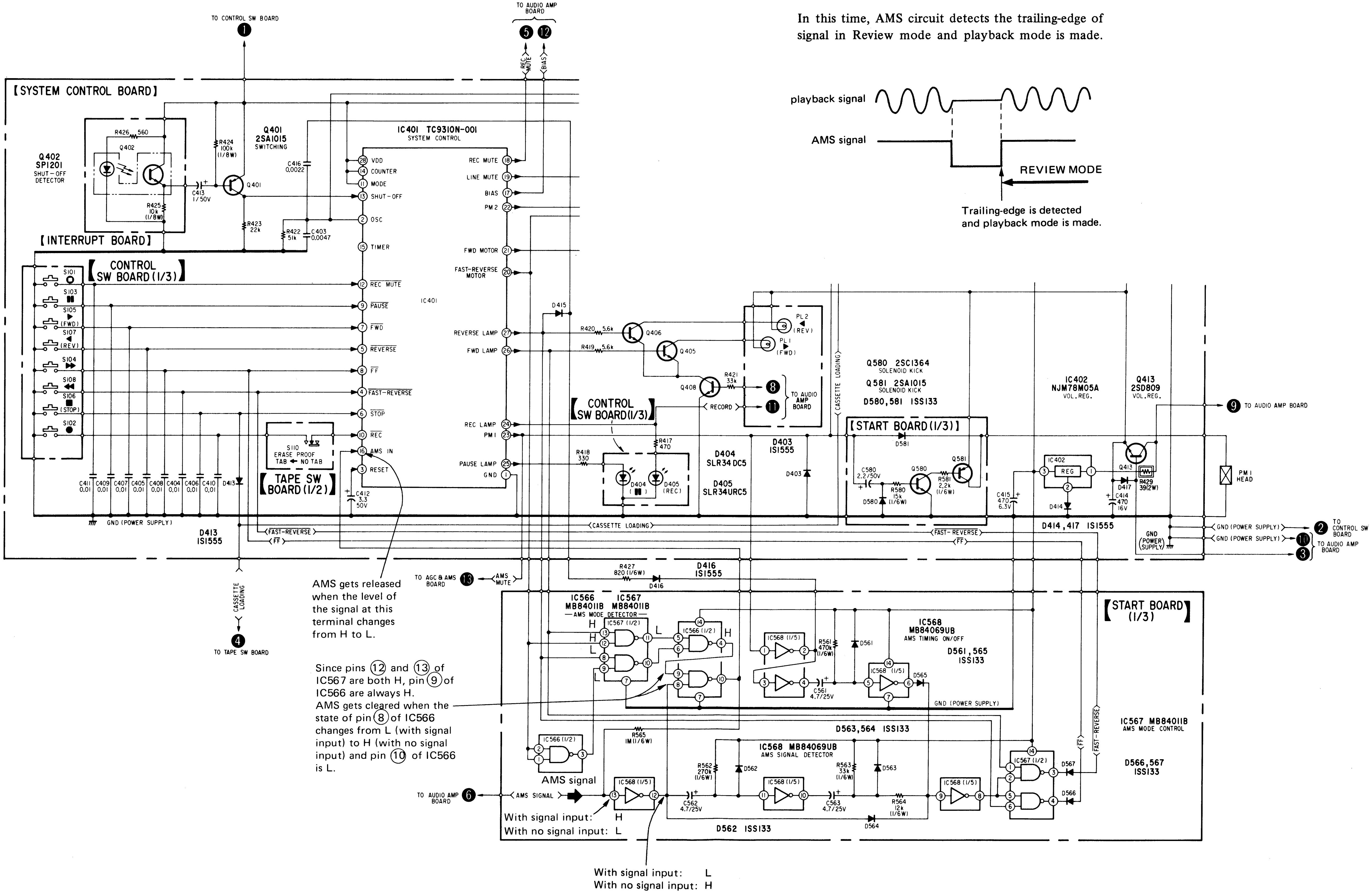
When the state changes from "H" (with no signal input) to "L" (with signal input), C562 starts to get charged and pin ⑪ of IC568 goes L. Goes H when the charging is completed.
(Takes about 0.6 seconds.)

Since pin ⑩ of IC568 goes L when pin ⑪ of IC568 goes H, C563 starts to get charged. This, in turn, makes pin ⑨ of IC567 go L.
(Takes about 0.1 seconds.)

Goes L when the signal goes off and then comes on again.
Goes H after a period of 0.1 seconds.

2. At ▶ (FWD) + ◀◀ (FAST-REVERSE)

In this time, AMS circuit detects the trailing-edge of signal in Review mode and playback mode is made.


playback signal
AMS signal
REVIEW MODE
Trailing-edge is detected and playback mode is made.
TO CONTROL SW BOARD
TO AUDIO AMP BOARD
REC MUTE
BIAS
[SYSTEM CONTROL BOARD]
[INTERRUPT BOARD]
Q402 SPI201 SHUT-OFF DETECTOR
R426 560
R424 100k (1/8W)
Q401 2SA1015 SWITCHING
C416 0.0022
C413 1/50V
R425 10k (1/8W)
R423 22k
R422 51k
C403 0.0047
IC401 TC9310N-001 SYSTEM CONTROL
VDD
COUNTER
MODE
SHUT-OFF
OSC
TIMER
REC MUTE
LINE MUTE
BIAS
PM 2
FWD MOTOR
FAST-REVERSE MOTOR
REVERSE LAMP
FWD LAMP
REC LAMP
PM I
PAUSE LAMP
GND
[CONTROL SW BOARD (1/3)]
S101
S103
S105 (FWD)
S107 (REV)
S104
S108
S106 (STOP)
S102
REC MUTE
PAUSE
FWD
REVERSE
FF
FAST-REVERSE
STOP
REC
AMS IN
RESET
S110 ERASE PROOF TAB ← NO TAB
[TAPE SW BOARD (1/2)]
C412 3.3 50V
C411 0.01
C409 0.01
C407 0.01
C405 0.01
C408 0.01
C404 0.01
C406 0.01
C410 0.01
D413
GND (POWER SUPPLY)
D413 IS1555
FAST-REVERSE
FF
CASSETTE LOADING
TO TAPE SW BOARD
D415
R420 5.6k
R419 5.6k
Q406
Q405
Q408
R421 33k
PL2 (REV)
PL1 (FWD)
RECORD
TO AUDIO AMP BOARD
[CONTROL SW BOARD (1/3)]
R418 330
R417 470
D404
D405 (REC)
D404 SLR34DC5
D405 SLR34URC5
D403 IS1555
Q580 2SC1364 SOLENOID KICK
Q581 2SA1015 SOLENOID KICK
D580,581 ISS133
[START BOARD (1/3)]
D581
C580 2.2/50V
R580 15k (1/6W)
R581 2.2k (1/6W)
D580
IC402 NJM78M05A VOL. REG.
Q413 2SD809 VOL. REG.
C415 470 6.3V
REG
D414
D417
C414 470 16V
R429 39(2W)
D414,417 IS1555
PM I HEAD
TO AUDIO AMP BOARD
GND (POWER SUPPLY)
TO CONTROL SW BOARD
TO AUDIO AMP BOARD
R427 820 (1/6W)
D416 IS1555
TO AGC & AMS BOARD
AMS MUTE
IC566 MB84011B
IC567 MB84011B
AMS MODE DETECTOR
IC567 (1/2)
IC566 (1/2)
H
H
H
L
L
H
L
IC568 (1/5)
R561 470k (1/6W)
D561
C561 4.7/25V
IC568 MB84069UB AMS TIMING ON/OFF
D561,565 ISS133
D565
GND (POWER SUPPLY)
[START BOARD (1/3)]
IC567 MB84011B AMS MODE CONTROL
D566,567 ISS133
R565 1M (1/6W)
D563,564 ISS133
IC568 MB84069UB AMS SIGNAL DETECTOR
R562 270k (1/6W)
D562
R563 33k (1/6W)
D563
R564 12k (1/6W)
C562 4.7/25V
C563 4.7/25V
D564
D562 ISS133
D567
D566
TO AUDIO AMP BOARD
AMS SIGNAL

AMS gets released when the level of the signal at this terminal changes from H to L.

Since pins ⑫ and ⑬ of IC567 are both H, pin ⑨ of IC566 are always H.
AMS gets cleared when the state of pin ⑧ of IC566 changes from L (with signal input) to H (with no signal input) and pin ⑩ of IC566 is L.

AMS signal

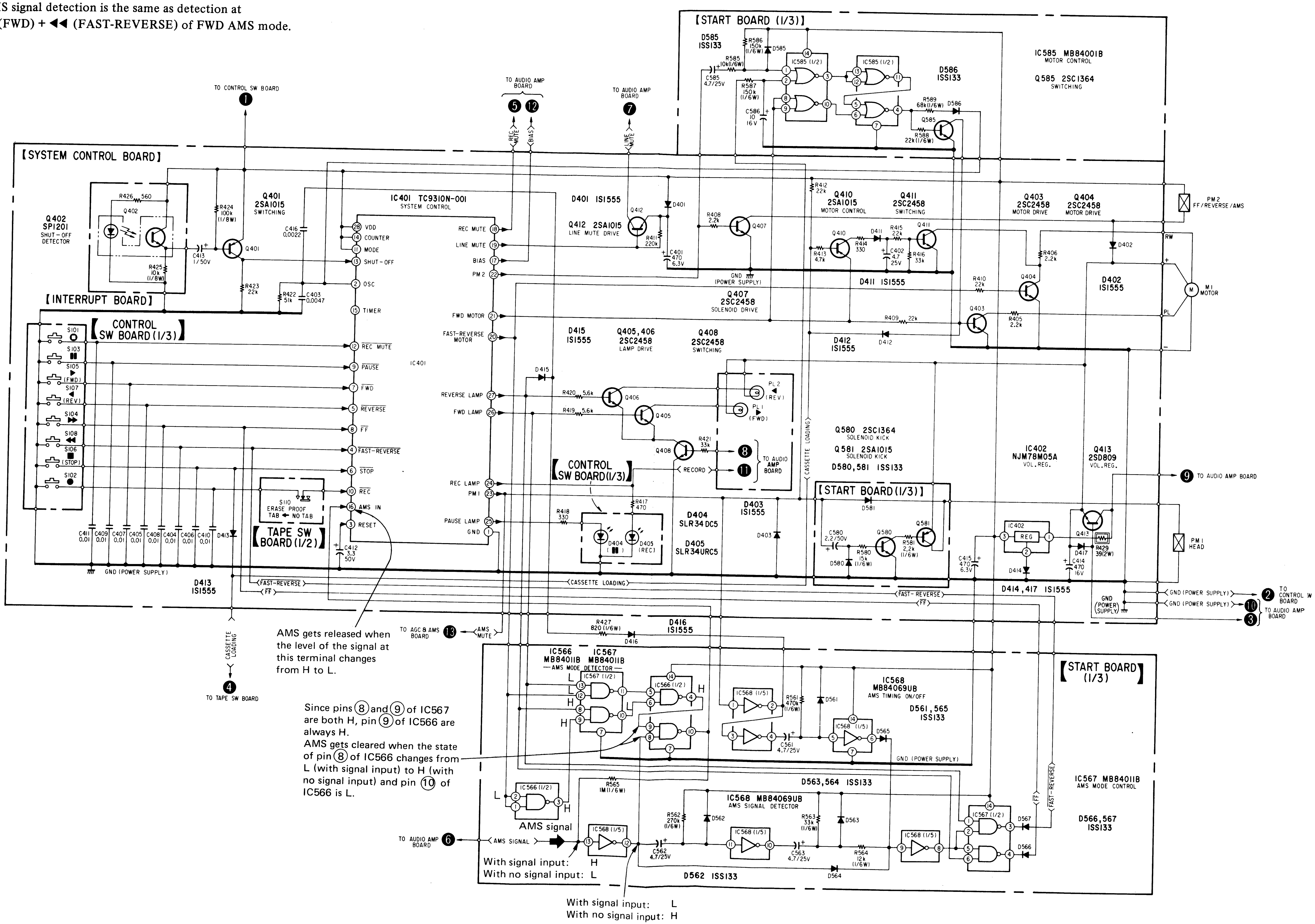
With signal input: H
With no signal input: L

With signal input: L
With no signal input: H

REVERSE AMS

1. At ◀ (REVERSE) + ▶▶ (FF)

AMS signal detection is the same as detection at ▶ (FWD) + ◀◀ (FAST-REVERSE) of FWD AMS mode.


[START BOARD (1/3)]
D585 1SS133
R586 150k (1/6W)
R585 10k(1/6W)
C585 4.7/25V
R587 150k (1/6W)
C586 10 16V
IC585 (1/2)
D586 1SS133
R589 68k(1/6W)
Q585
R588 22k(1/6W)
IC585 MB84001B MOTOR CONTROL
Q585 2SC1364 SWITCHING
TO CONTROL SW BOARD
TO AUDIO AMP BOARD
REC MUTE
BIAS
LINE MUTE
[SYSTEM CONTROL BOARD]
Q402 SP1201 SHUT-OFF DETECTOR
R426 560
R424 100k (1/8W)
Q401 2SA1015 SWITCHING
C416 0.0022
C413 1/50V
R425 10k (1/8W)
R423 22k
R422 51k
C403 0.0047
[INTERRUPT BOARD]
IC401 TC9310N-001 SYSTEM CONTROL
VDD
COUNTER
MODE
SHUT-OFF
OSC
TIMER
REC MUTE
LINE MUTE
BIAS
PM 2
FWD MOTOR
FAST-REVERSE MOTOR
REVERSE LAMP
FWD LAMP
REC LAMP
PM 1
PAUSE LAMP
GND
D401 1S1555
Q412 2SA1015 LINE MUTE DRIVE
R411 220k
C401 470 6.3V
R408 2.2k
Q407
GND (POWER SUPPLY)
Q407 2SC2458 SOLENOID DRIVE
R412 22k
Q410 2SA1015 MOTOR CONTROL
Q411 2SC2458 SWITCHING
R415 2.2k
R414 330
R413 4.7k
C402 4.7 25V
R416 33k
D411 1S1555
Q403 2SC2458 MOTOR DRIVE
Q404 2SC2458 MOTOR DRIVE
PM 2 FF/REVERSE/AMS
R406 2.2k
D402
D402 1S1555
M1 MOTOR
R410 22k
R409 22k
R405 2.2k
D412 1S1555
[CONTROL SW BOARD (1/3)]
S101
S103
S105 (FWD)
S107 (REV)
S104
S108
S106 (STOP)
S102
REC MUTE
PAUSE
FWD
REVERSE
FF
FAST-REVERSE
STOP
REC
AMS IN
RESET
IC401
S110 ERASE PROOF TAB ← NO TAB
[TAPE SW BOARD (1/2)]
C412 3.3 50V
C411 0.01
C409 0.01
C407 0.01
C405 0.01
C408 0.01
C404 0.01
C406 0.01
C410 0.01
D413
GND (POWER SUPPLY)
D413 1S1555
D415 1S1555
Q405,406 2SC2458 LAMP DRIVE
Q408 2SC2458 SWITCHING
R420 5.6k
R419 5.6k
PL2 (REV)
PL1 (FWD)
R421 33k
RECORD
TO AUDIO AMP BOARD
[CONTROL SW BOARD (1/3)]
R418 330
R417 470
D404 (II)
D405 (REC)
D404 SLR34DC5
D405 SLR34URC5
D403 1S1555
CASSETTE LOADING
Q580 2SC1364 SOLENOID KICK
Q581 2SA1015 SOLENOID KICK
D580,581 1SS133
[START BOARD (1/3)]
C580 2.2/50V
R580 15k
R581 2.2k (1/6W)
IC402 NJM78M05A VOL.REG.
Q413 2SD809 VOL.REG.
REG
C415 470 6.3V
C414 470 16V
R429 39(2W)
D414,417 1S1555
TO AUDIO AMP BOARD
PM 1 HEAD
GND (POWER SUPPLY)
TO CONTROL SW BOARD
TO AUDIO AMP BOARD
FAST-REVERSE
FF
TO TAPE SW BOARD
TO AGC & AMS BOARD
AMS MUTE
R427 820 (1/6W)
D416 1S1555
IC566 MB84011B
IC567 MB84011B
AMS MODE DETECTOR
IC567 (1/2)
IC566 (1/2)
IC568 (1/5)
R561 470k (1/6W)
D561
IC568 MB84069UB AMS TIMING ON/OFF
D561,565 1SS133
C561 4.7/25V
D565
GND (POWER SUPPLY)
[START BOARD (1/3)]
R565 1M(1/6W)
D563,564 1SS133
IC568 MB84069UB AMS SIGNAL DETECTOR
R562 270k (1/6W)
D562
R563 33k (1/6W)
D563
C562 4.7/25V
C563 4.7/25V
R564 12k (1/6W)
D564
D562 1SS133
IC567 MB84011B AMS MODE CONTROL
D566,567 1SS133
D567
D566
TO AUDIO AMP BOARD
AMS SIGNAL
L
H

AMS gets released when the level of the signal at this terminal changes from H to L.

Since pins ⑧ and ⑨ of IC567 are both H, pin ⑨ of IC566 are always H.
AMS gets cleared when the state of pin ⑧ of IC566 changes from L (with signal input) to H (with no signal input) and pin ⑩ of IC566 is L.

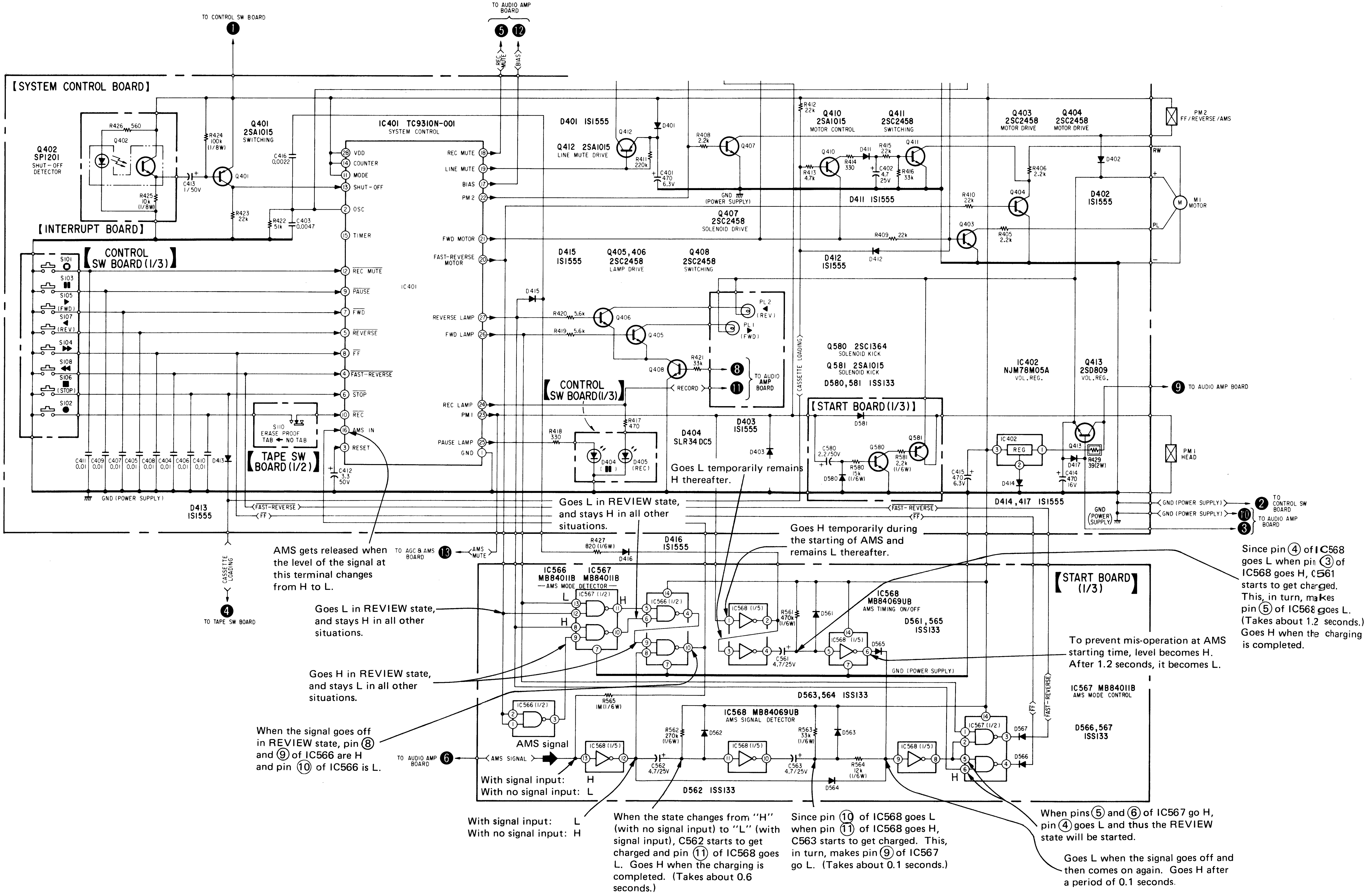
AMS signal

With signal input: H
With no signal input: L

With signal input: L
With no signal input: H

2. At ◀ (REVERSE) + ◀◀ (FAST-REVERSE)

AMS signal detection is the same as detection at ▶ (FWD) + ▶▶ (FF) of FWD AMS mode.



TO CONTROL SW BOARD ❶
TO AUDIO AMP BOARD ❺ ⓬
REC MUTE
BIAS
[SYSTEM CONTROL BOARD]
[INTERRUPT BOARD]
Q402 SP1201 SHUT-OFF DETECTOR
R426 560
R424 100k (1/8W)
Q401 2SA1015 SWITCHING
C413 1/50V
R425 10k (1/8W)
R423 22k
R422 51k
C403 0.0047
C416 0.0022
IC401 TC9310N-001 SYSTEM CONTROL
VDD
COUNTER
MODE
SHUT-OFF
OSC
TIMER
REC MUTE
PAUSE
FWD
REVERSE
FF
FAST-REVERSE
STOP
REC
AMS IN
RESET
LINE MUTE
BIAS
PM 2
FWD MOTOR
FAST-REVERSE MOTOR
REVERSE LAMP
FWD LAMP
REC LAMP
PM1
PAUSE LAMP
GND
[CONTROL SW BOARD (1/3)]
S101 S103 S105 (FWD) S107 (REV) S104 S108 S106 (STOP) S102
S110 ERASE PROOF TAB ← NO TAB
[TAPE SW BOARD (1/2)]
C412 3.3 50V
C411 0.01 C409 0.01 C407 0.01 C405 0.01 C408 0.01 C404 0.01 C406 0.01 C410 0.01
D413 1S1555
GND (POWER SUPPLY)
FAST-REVERSE
FF
CASSETTE LOADING
TO TAPE SW BOARD ❹
D401 1S1555
Q412 2SA1015 LINE MUTE DRIVE
R411 220k
C401 470 6.3V
R408 2.2k
Q407 2SC2458 SOLENOID DRIVE
GND (POWER SUPPLY)
R412 22k
Q410 2SA1015 MOTOR CONTROL
Q411 2SC2458 SWITCHING
R413 4.7k R414 330 R415 22k C402 4.7 25V R416 33k
D411 1S1555
Q403 2SC2458 MOTOR DRIVE
Q404 2SC2458 MOTOR DRIVE
R406 2.2k R410 22k R405 2.2k R409 22k
D402 1S1555
PM2 FF/REVERSE/AMS
M1 MOTOR
D412 1S1555
D415 1S1555
Q405,406 2SC2458 LAMP DRIVE
Q408 2SC2458 SWITCHING
R420 5.6k R419 5.6k R421 33k
PL2 (REV) PL1 (FWD)
❽ ⓫ TO AUDIO AMP BOARD
RECORD
[CONTROL SW BOARD (1/3)]
R418 330 R417 470
D404 (❚❚) D405 (REC)
D404 SLR34DC5
D403 1S1555
Q580 2SC1364 SOLENOID KICK
Q581 2SA1015 SOLENOID KICK
D580,581 1SS133
[START BOARD (1/3)]
C580 2.2/50V R580 15k R581 2.2k (1/6W)
IC402 NJM78M05A VOL. REG.
Q413 2SD809 VOL. REG.
REG
C415 470 6.3V
C414 470 16V
R429 39(2W)
D414,417 1S1555
PM1 HEAD
TO AUDIO AMP BOARD ❾
GND (POWER SUPPLY)
TO CONTROL SW BOARD ❷
TO AUDIO AMP BOARD ❿ ❸
TO AGC & AMS BOARD ⓭ AMS MUTE
R427 820 (1/6W)
D416 1S1555
IC566 MB84011B IC567 MB84011B —AMS MODE DETECTOR—
IC568 MB84069UB AMS TIMING ON/OFF
R561 470k (1/6W)
C561 4.7/25V
D561,565 1SS133
[START BOARD (1/3)]
IC567 MB84011B AMS MODE CONTROL
D566,567 1SS133
D563,564 1SS133
R565 1M (1/6W)
IC568 MB84069UB AMS SIGNAL DETECTOR
R562 270k (1/6W) R563 33k (1/6W) R564 12k (1/6W)
C562 4.7/25V C563 4.7/25V
D562 1SS133
TO AUDIO AMP BOARD ❻ AMS SIGNAL
GND (POWER SUPPLY)

Goes L temporarily remains H thereafter.

Goes L in REVIEW state, and stays H in all other situations.

Goes H temporarily during the starting of AMS and remains L thereafter.

AMS gets released when the level of the signal at this terminal changes from H to L.

Goes L in REVIEW state, and stays H in all other situations.

Goes H in REVIEW state, and stays L in all other situations.

When the signal goes off in REVIEW state, pin ⑧ and ⑨ of IC566 are H and pin ⑩ of IC566 is L.

AMS signal

With signal input: H
With no signal input: L

Since pin ④ of IC568 goes L when pin ③ of IC568 goes H, C561 starts to get charged. This, in turn, makes pin ⑤ of IC568 goes L. (Takes about 1.2 seconds.) Goes H when the charging is completed.

To prevent mis-operation at AMS starting time, level becomes H. After 1.2 seconds, it becomes L.

With signal input: L
With no signal input: H

When the state changes from "H" (with no signal input) to "L" (with signal input), C562 starts to get charged and pin ⑪ of IC568 goes L. Goes H when the charging is completed. (Takes about 0.6 seconds.)

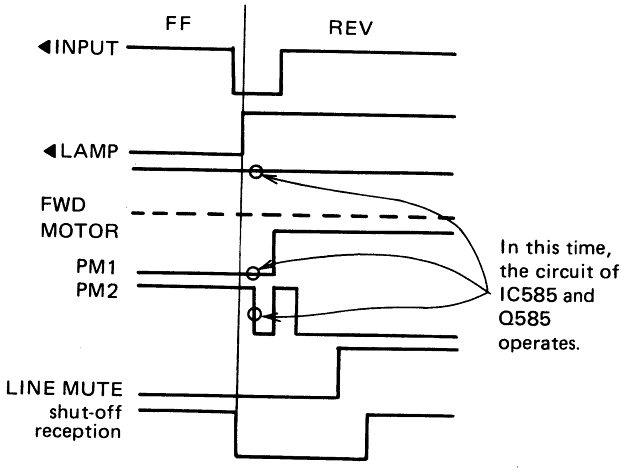
Since pin ⑩ of IC568 goes L when pin ⑪ of IC568 goes H, C563 starts to get charged. This, in turn, makes pin ⑨ of IC567 go L. (Takes about 0.1 seconds.)

When pins ⑤ and ⑥ of IC567 go H, pin ④ goes L and thus the REVIEW state will be started.

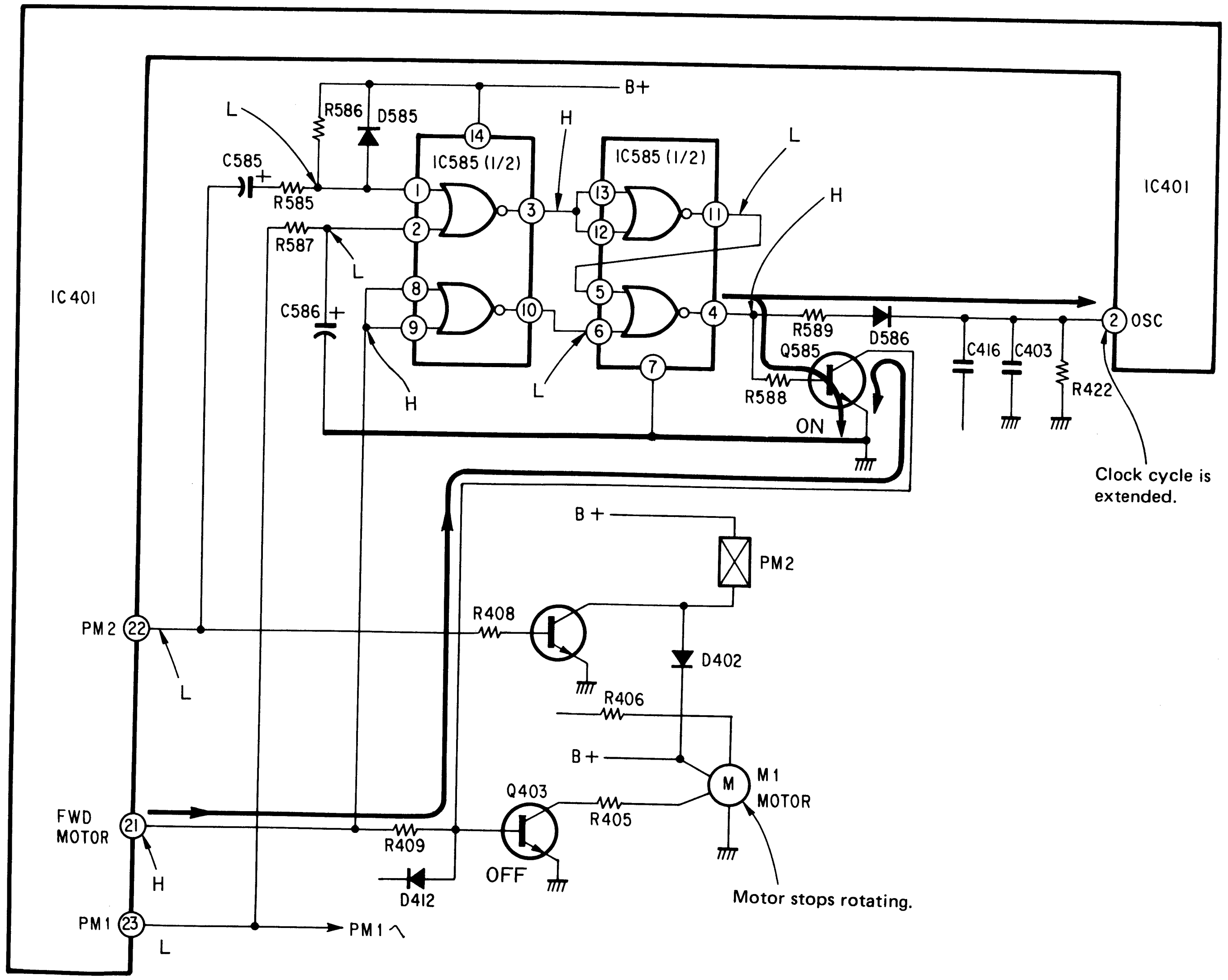
Goes L when the signal goes off and then comes on again. Goes H after a period of 0.1 seconds.

1-3. IC585 and Q585

- Purpose
  This circuitry is provided to stop the motor momentarily when the REVERSE (◀) button is depressed with the deck in the FF (▶▶) mode, and at the same time, also extend the cycle of the clock signal while the motor is stationary, in order to provide the correct timing for IC401.
- Function
  When the REVERSE (◀) button is depressed with the deck in the FF (▶▶) mode and the deck goes into the REV mode, terminal ㉑ of IC401 stays at 'H' and so the motor continues to turn.
  When in the FF (▶▶) mode, there is a period of approximately two seconds from the time that the deck reaches the end of the tape to the time that it shuts off.
  If the REVERSE (◀) button is depressed during this shutting off period, PM2 momentarily goes to 'L', however, the motor continues to turn and so the FR gear and the reel gear (take-up side) stay engaged. In order to prevent this, Q585 goes ON when the REVERSE (◀) button is depressed to forcibly stop the motor and disengage the gears. In order to provide the proper timing for IC401, the clock cycle is extended by the time that the motor is stationary.
- IC401 timing when going from FF to REVERSE


FF
REV
◀INPUT
◀LAMP
FWD MOTOR
PM1
PM2
LINE MUTE
shut-off reception

In this time, the circuit of IC585 and Q585 operates.

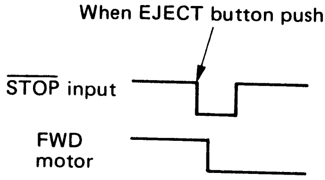

IC401
B+
R586
D585
L
H
C585
R585
R587
C586
IC585 (1/2)
IC585 (1/2)
R589
D586
Q585
R588
ON
C416
C403
R422
OSC
PM2
R408
D402
R406
M1
MOTOR
Q403
R405
OFF
FWD MOTOR
R409
D412
PM1
PM1 ↖

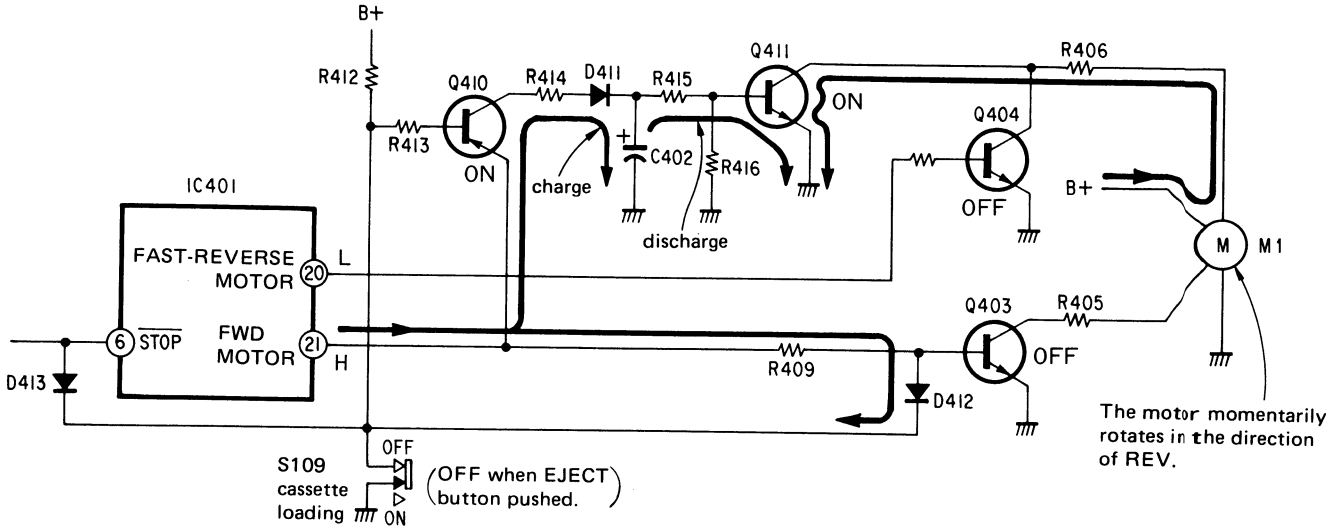
Clock cycle is extended.

Motor stops rotating.

1-4. Q410 and Q411

- Purpose
  Q410 and Q411 are used to prevent the head from striking the cassette half when it opens and sustaining damage.
- Function
  It requires approximately 0.8 seconds for the FWD cam gear to make one revolution when the FWD or REV buttons are depressed. If during this time the EJECT button is depressed, the head will rise up into the cassette housing cover as it opens and could sustain damage by striking the edge of the cassette half. Therefore, in order to prevent this, the moment that the EJECT button is depressed, the cathode of D412 is grounded to prevent the motor from turning in the FWD direction; Q410 and Q411 go ON, to turn the motor in the REVERSE direction and turn the FWD cam gear in the reverse direction, and lower the head mounting base (R).
- Timing of IC401 when eject button is depressed
  – When EJECT button is depressed

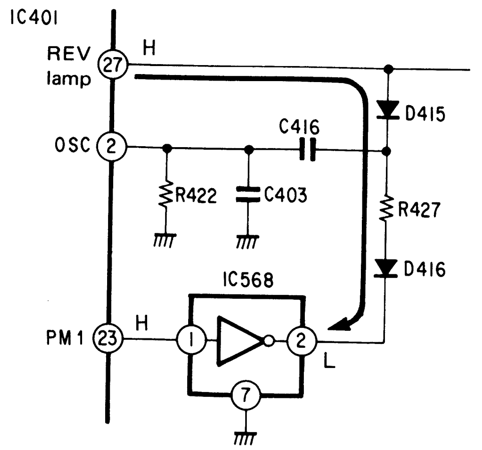

When EJECT button pushed.
STOP input
FWD motor

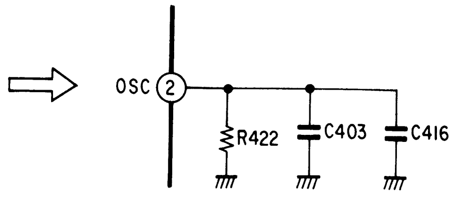

B+
R412
Q410
R413
ON
R414
D411
R415
charge
C402
R416
discharge
Q411
ON
R406
Q404
OFF
B+
M
M1
IC401
FAST-REVERSE MOTOR
L
STOP
FWD MOTOR
H
D413
Q403
R405
OFF
R409
D412
S109 cassette loading
OFF
ON
(OFF when EJECT button pushed.)

The motor momentarily rotates in the direction of REV.

1-5. C416

- Purpose
  C416 is provided in order to lower the clock oscillation frequency of IC401 when the deck is in the REVERSE (◀) mode, to make the ON time of PM2 0.8 seconds (time required for the FF cam gear to turn one revolution).
- Function
  When in the REVERSE (◀) mode, terminals ㉗ and ㉓ of IC401 go 'H' and current flows as shown in the illustration below; and this causes the resistance of D415 and D416 to come down. This then causes C416 to be connected in parallel with C403, and the clock oscillation frequency of IC401 becomes low.


IC401
REV lamp
H
OSC
C416
D415
R422
C403
R427
IC568
D416
PM1
H
L


OSC
R422
C403
C416

$f_{OSC} \approx 2.15/RC$ (Hz)

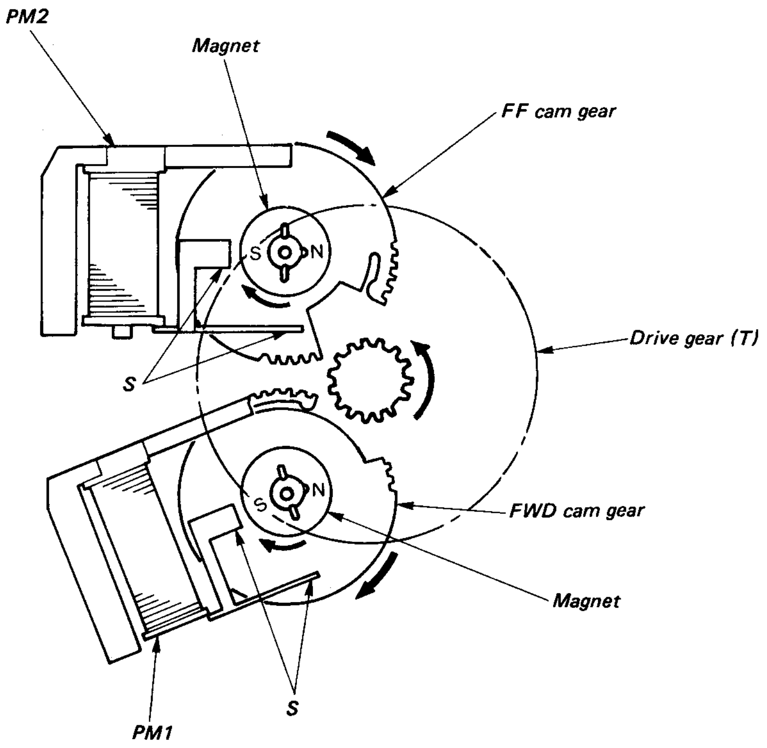
SECTION 2
OPERATION DESCRIPTION

The mechanism of this deck provides selection of different modes by kicking the FWD cam gear and FF cam gear by the solenoid coils (PM1, PM2) to engage them with the dirve gear (T) and turn.
The drive gear (T) is driven by the flywheel that is engaged with the pinion secured to the flywheel. The various different modes are described below.

2-1. Kicking function for FWD cam gear, FF cam gear when current is flowing through solenoid

The magnet is turned in a clockwise direction by the magnetic force generated by the solenoid coil. Since the magnet turns, the FWD cam gear and FF cam gear that are integrated with the magnet are kicked in the direction indicated by the arrow, to engage the drive gear (T).
When the drive gear (T) turns, the FWD cam gear and the FF cam gear turn one time, and the cutaway sections of these gear cause them to disengage from the drive gear (T).

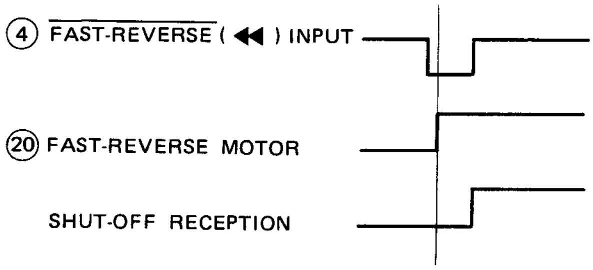
KICK OPERATION OF CAM GEAR



2-2. FAST-REVERSE MODE

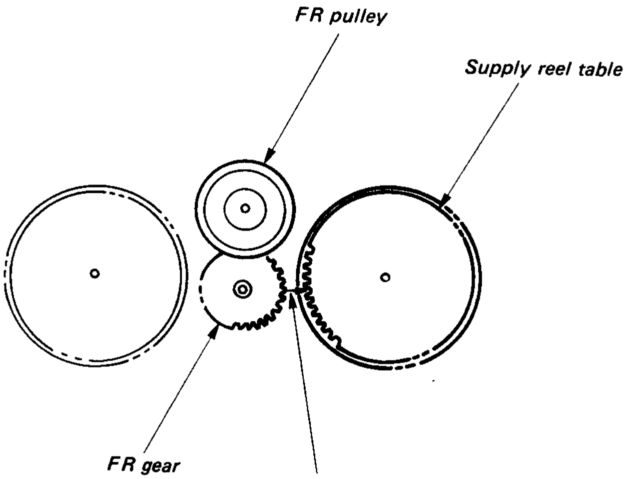
- **TIMING OF IC401**

STOP ⟶ FAST-REVERSE


④ FAST-REVERSE (◀◀) INPUT
⑳ FAST-REVERSE MOTOR
SHUT-OFF RECEPTION

- **MECHANISM OPERATION**

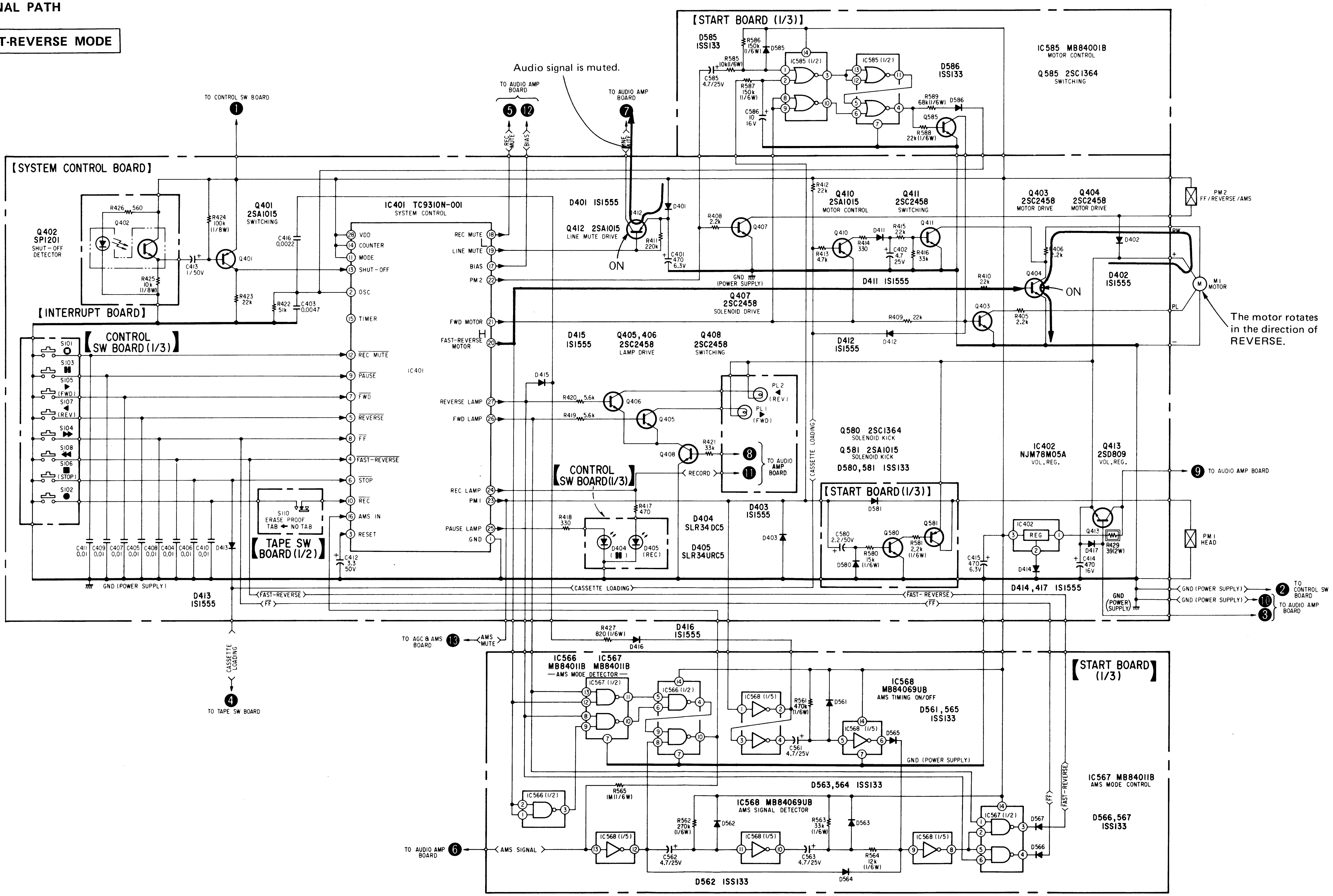
FAST-REVERSE OPERATION


FR pulley
Supply reel table
FR gear

Because of the friction generated when the FR pulley is turning, the FR gear shifts in the direction indicated by the arrow, to drive the reel on the tape supply side.

- **SIGNAL PATH**

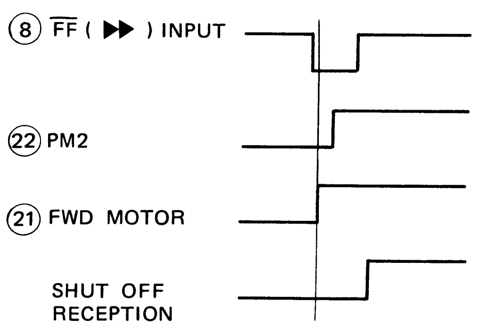
FAST-REVERSE MODE


Audio signal is muted.
[START BOARD (1/3)]
[SYSTEM CONTROL BOARD]
[INTERRUPT BOARD]
[CONTROL SW BOARD (1/3)]
[TAPE SW BOARD (1/2)]
[CONTROL SW BOARD (1/3)]
[START BOARD (1/3)]
[START BOARD (1/3)]
TO CONTROL SW BOARD ①
TO AUDIO AMP BOARD ⑤ ⑫
TO AUDIO AMP BOARD ⑦
REC MUTE
BIAS
LINE MUTE
Q402 SP1201 SHUT-OFF DETECTOR
Q401 2SA1015 SWITCHING
IC401 TC9310N-001 SYSTEM CONTROL
VDD
COUNTER
MODE
SHUT-OFF
OSC
TIMER
REC MUTE
PAUSE
FWD
REVERSE
FF
FAST-REVERSE
STOP
REC
AMS IN
RESET
REC MUTE
LINE MUTE
BIAS
PM 2
FWD MOTOR
FAST-REVERSE MOTOR
H
L
REVERSE LAMP
FWD LAMP
REC LAMP
PM I
PAUSE LAMP
GND
D401 1S1555
Q412 2SA1015 LINE MUTE DRIVE
ON
Q407 2SC2458 SOLENOID DRIVE
Q410 2SA1015 MOTOR CONTROL
Q411 2SC2458 SWITCHING
D411 1S1555
Q403 2SC2458 MOTOR DRIVE
Q404 2SC2458 MOTOR DRIVE
D402 1S1555
ON
M1 MOTOR
PM2 FF/REVERSE/AMS
The motor rotates in the direction of REVERSE.
D412 1S1555
D415 1S1555
Q405,406 2SC2458 LAMP DRIVE
Q408 2SC2458 SWITCHING
PL2 (REV)
PL1 (FWD)
TO AUDIO AMP BOARD ⑧ ⑪
RECORD
D404 SLR34DC5
D405 SLR34URC5
D403 1S1555
Q580 2SC1364 SOLENOID KICK
Q581 2SA1015 SOLENOID KICK
D580,581 1SS133
IC402 NJM78M05A VOL. REG.
Q413 2SD809 VOL. REG.
TO AUDIO AMP BOARD ⑨
PM1 HEAD
D414,417 1S1555
GND (POWER SUPPLY)
TO CONTROL SW BOARD ②
TO AUDIO AMP BOARD ⑩ ③
CASSETTE LOADING
FAST-REVERSE
FF
D413 1S1555
TO TAPE SW BOARD ④
TO AGC & AMS BOARD ⑬
AMS MUTE
D416 1S1555
S101 ○
S103 ❚❚
S105 ▶ (FWD)
S107 ◀ (REV)
S104 ▶▶
S108 ◀◀
S106 ■ (STOP)
S102 ●
S110 ERASE PROOF TAB ← NO TAB
IC585 MB84001B MOTOR CONTROL
Q585 2SC1364 SWITCHING
D585 1SS133
D586 1SS133
IC566 IC567 MB84011B MB84011B —AMS MODE DETECTOR—
IC568 MB84069UB AMS TIMING ON/OFF
D561,565 1SS133
D563,564 1SS133
IC568 MB84069UB AMS SIGNAL DETECTOR
D562 1SS133
IC567 MB84011B AMS MODE CONTROL
D566,567 1SS133
TO AUDIO AMP BOARD ⑥
AMS SIGNAL
GND (POWER SUPPLY)

2-3. FF MODE

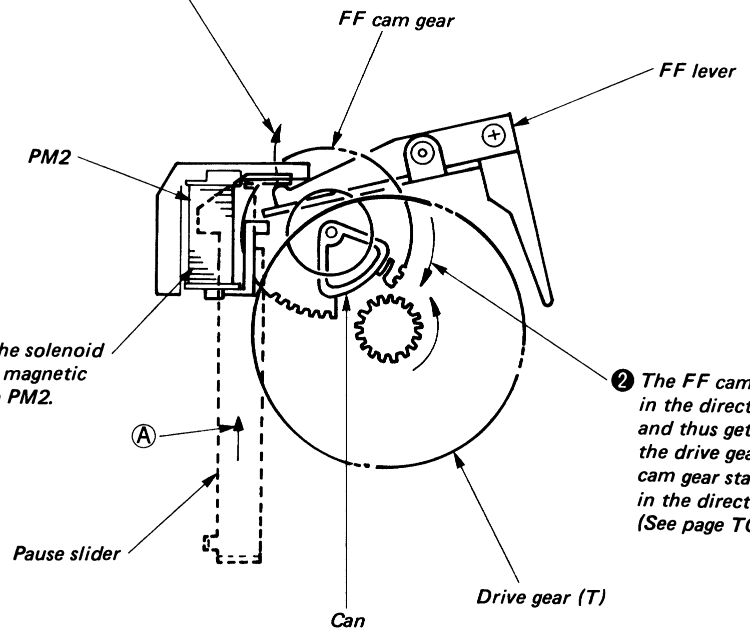
- **TIMING OF IC401**

STOP → FF



- **MECHANISM OPERATION**

FF OPERATION (1)

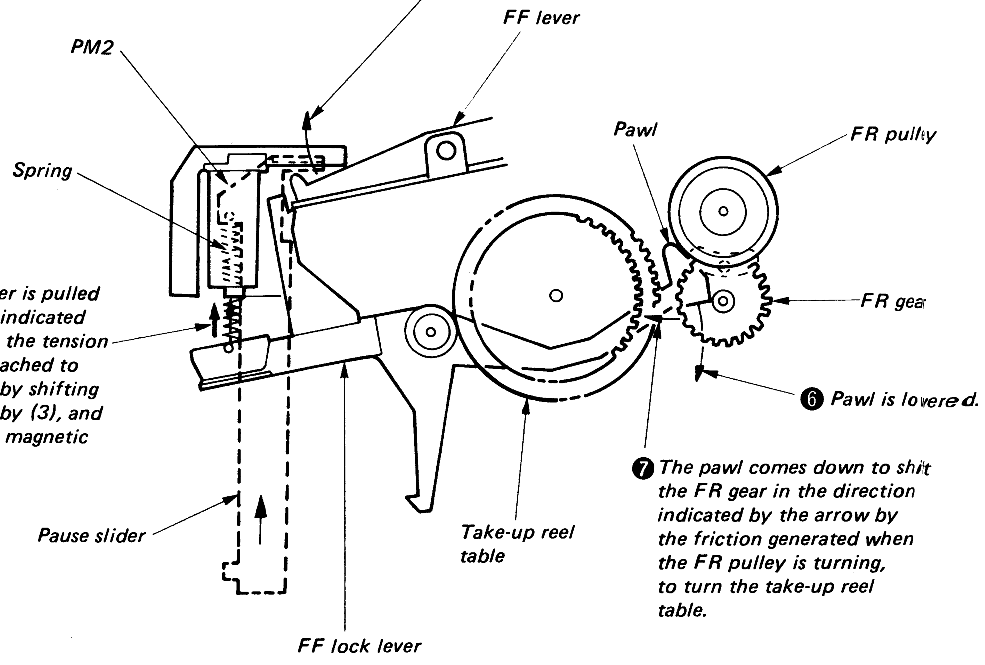

FF cam gear
FF lever
PM2
Ⓐ
Pause slider
Can
Drive gear (T)

❶ *A current flows in the solenoid coil of PM2 and the magnetic force is generated in PM2.*

❷ *The FF cam gear gets thrown in the direction of the arrow and thus gets engaged with the drive gear and the FF cam gear starts rotating in the direction of the arrow. (See page TC-15)*

❸ *The FF lever gets pushed by the cam of the FF cam gear in the direction of the arrow and the pause slider gets pushed up in the direction of the arrow Ⓐ.*

FF OPERATION (2)


PM2
Spring
FF lever
Pawl
FR pulley
FR gear
Pause slider
Take-up reel table
FF lock lever

❹ *The FF lock lever is released by the turning of the FF lever in the direction indicated by the arrow.*

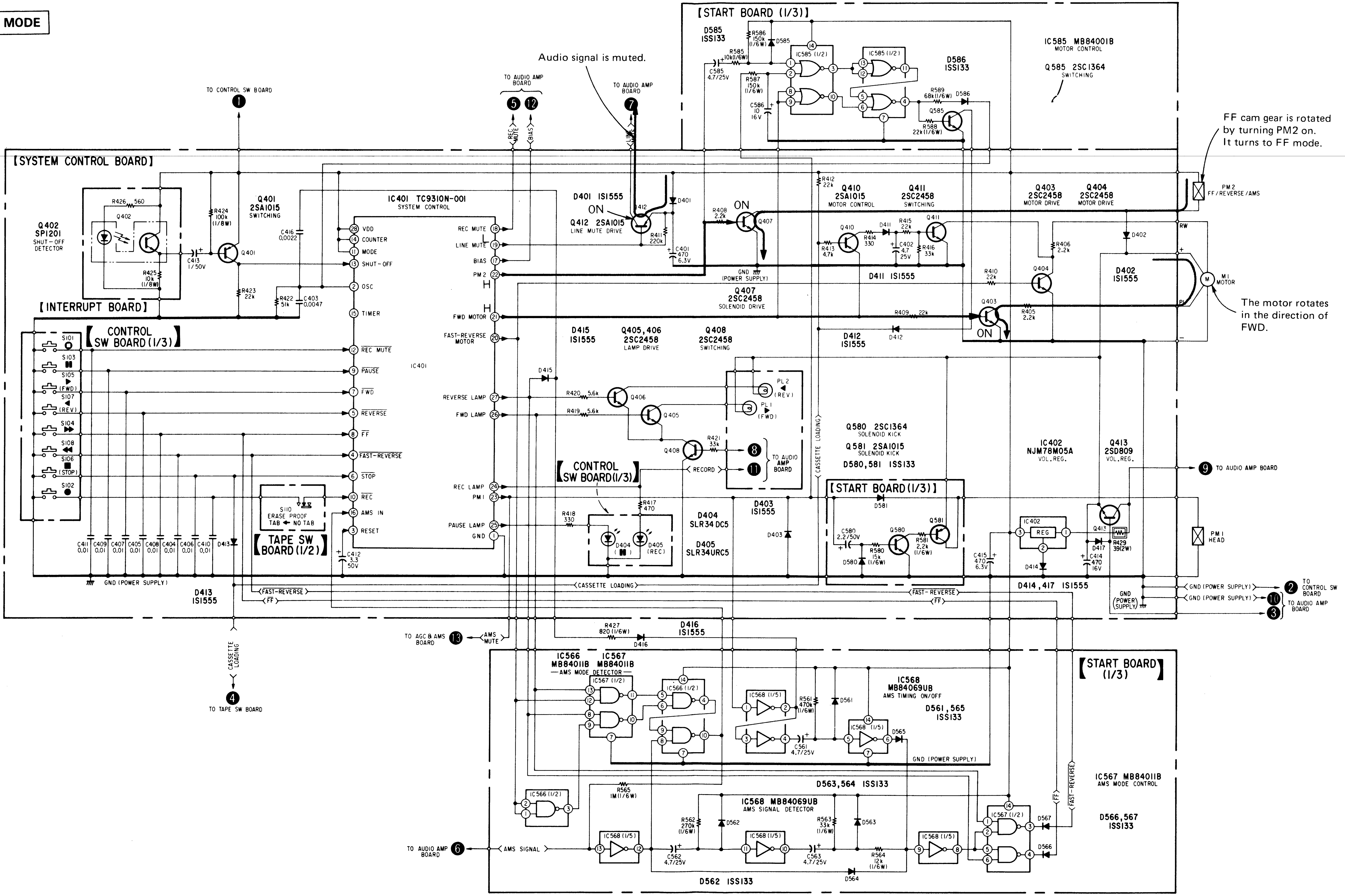
❺ *The FF lock lever is pulled in the direction indicated by the arrow by the tension of the spring attached to the pause slider by shifting the pause slider by (3), and attracted by the magnetic force of PM2.*

❻ *Pawl is lowered.*

❼ *The pawl comes down to shift the FR gear in the direction indicated by the arrow by the friction generated when the FR pulley is turning, to turn the take-up reel table.*

SIGNAL PATH

FF MODE


Audio signal is muted.

FF cam gear is rotated by turning PM2 on. It turns to FF mode.

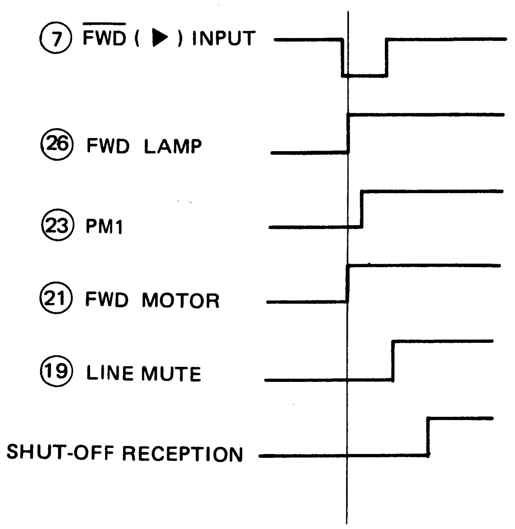
The motor rotates in the direction of FWD.

[SYSTEM CONTROL BOARD]
[INTERRUPT BOARD]
[CONTROL SW BOARD (1/3)]
[TAPE SW BOARD (1/2)]
[START BOARD (1/3)]
IC401 TC9310N-001 SYSTEM CONTROL
Q401 2SA1015 SWITCHING
Q402 SP1201 SHUT-OFF DETECTOR
D401 1S1555
Q412 2SA1015 LINE MUTE DRIVE
Q407 2SC2458 SOLENOID DRIVE
Q410 2SA1015 MOTOR CONTROL
Q411 2SC2458 SWITCHING
Q403 2SC2458 MOTOR DRIVE
Q404 2SC2458 MOTOR DRIVE
D402 1S1555
D411 1S1555
D412 1S1555
D413 1S1555
D415 1S1555
Q405,406 2SC2458 LAMP DRIVE
Q408 2SC2458 SWITCHING
D403 1S1555
D404 SLR34DC5
D405 SLR34URC5
Q580 2SC1364 SOLENOID KICK
Q581 2SA1015 SOLENOID KICK
D580,581 1SS133
IC402 NJM78M05A VOL.REG.
Q413 2SD809 VOL.REG.
D414,417 1S1555
IC585 MB84001B MOTOR CONTROL
Q585 2SC1364 SWITCHING
D585 1SS133
D586 1SS133
IC566 MB84011B
IC567 MB84011B
AMS MODE DETECTOR
IC568 MB84069UB AMS TIMING ON/OFF
D561,565 1SS133
D563,564 1SS133
IC568 MB84069UB AMS SIGNAL DETECTOR
D562 1SS133
IC567 MB84011B AMS MODE CONTROL
D566,567 1SS133
D416 1S1555
PM2 FF/REVERSE/AMS
M1 MOTOR
PM1 HEAD
PL1 (FWD)
PL2 (REV)
S101 S103 S105 (FWD) S107 (REV) S104 S108 S106 (STOP) S102
S110 ERASE PROOF TAB ← NO TAB
VDD COUNTER MODE SHUT-OFF OSC TIMER
REC MUTE PAUSE FWD REVERSE FF FAST-REVERSE STOP REC AMS IN RESET
REC MUTE LINE MUTE BIAS PM2 FWD MOTOR FAST-REVERSE MOTOR REVERSE LAMP FWD LAMP REC LAMP PM1 PAUSE LAMP GND
ON
H
TO CONTROL SW BOARD ①
TO AUDIO AMP BOARD ⑤ ⑫
TO AUDIO AMP BOARD ⑦
TO AUDIO AMP BOARD ⑧ ⑪
TO AUDIO AMP BOARD ⑨
TO CONTROL SW BOARD ②
TO AUDIO AMP BOARD ⑩ ③
TO TAPE SW BOARD ④
TO AGC & AMS BOARD ⑬
TO AUDIO AMP BOARD ⑥
AMS SIGNAL
AMS MUTE
CASSETTE LOADING
FAST-REVERSE
FF
RECORD
GND (POWER SUPPLY)

2-4. FWD MODE

- **TIMING OF IC401**

STOP→FWD

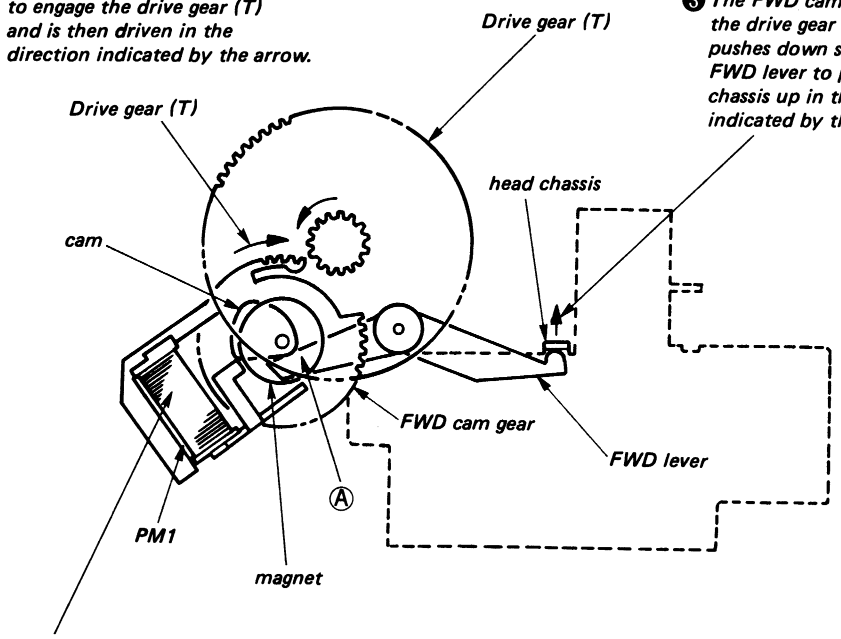


- **MECHANISM OPERATION**

FWD OPERATION (1)

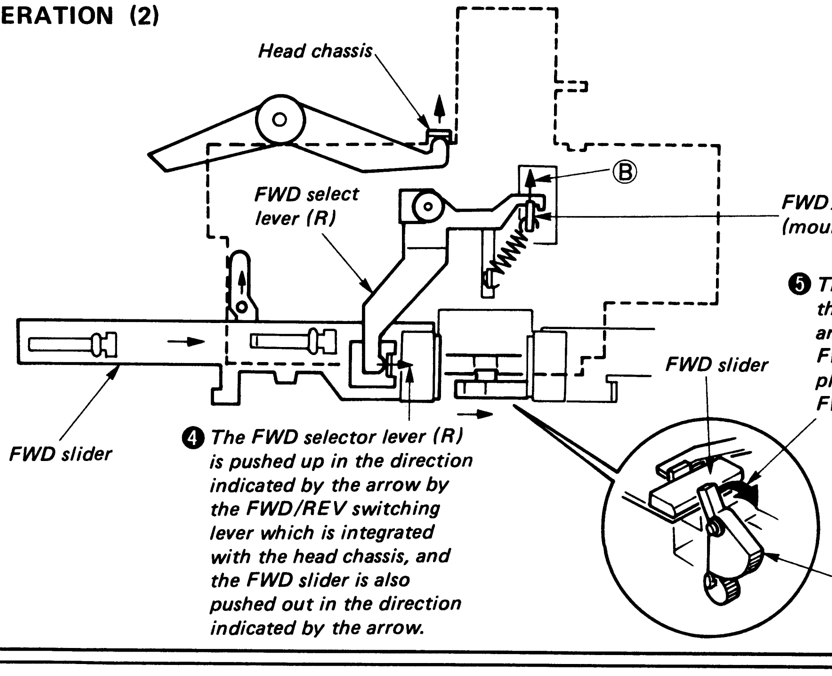
❷ *The FWD cam gear is shifted in the direction indicated by the arrow (refer to page TC-15) to engage the drive gear (T) and is then driven in the direction indicated by the arrow.*

❸ *The FWD cam gear is driven by the drive gear (T), and the cam pushes down section Ⓐ of the FWD lever to push the head chassis up in the direction indicated by the arrow.*


Drive gear (T)
Drive gear (T)
head chassis
cam
FWD cam gear
FWD lever
Ⓐ
PM1
magnet

❶ *Current flows through the solenoid coil, to generate magnetic force.*

FWD OPERATION (2)


Head chassis
Ⓑ
FWD select lever (R)
FWD/REV select lever (mounted on head chassis)
FWD slider
FWD slider
Rotary head gear

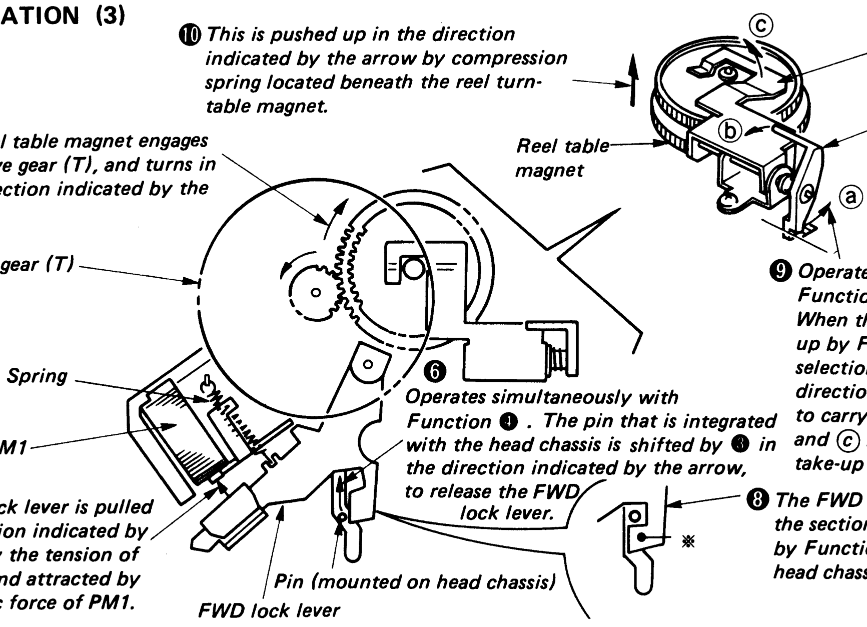
❹ *The FWD selector lever (R) is pushed up in the direction indicated by the arrow by the FWD/REV switching lever which is integrated with the head chassis, and the FWD slider is also pushed out in the direction indicated by the arrow.*

❺ *The rotating head gear turns in the direction indicated by the arrow by the shifting of the FWD slider, and the record/playback head moves to the FWD position.*

FWD OPERATION (3)

❿ *This is pushed up in the direction indicated by the arrow by compression spring located beneath the reel turn-table magnet.*

⓫ *The reel table magnet engages the drive gear (T), and turns in the direction indicated by the arrow.*


ⓒ
Take-up gear retainer
Take-up selection lever
Reel table magnet
ⓑ
ⓐ
Drive gear (T)
Spring
PM1
❻
※
Pin (mounted on head chassis)
FWD lock lever

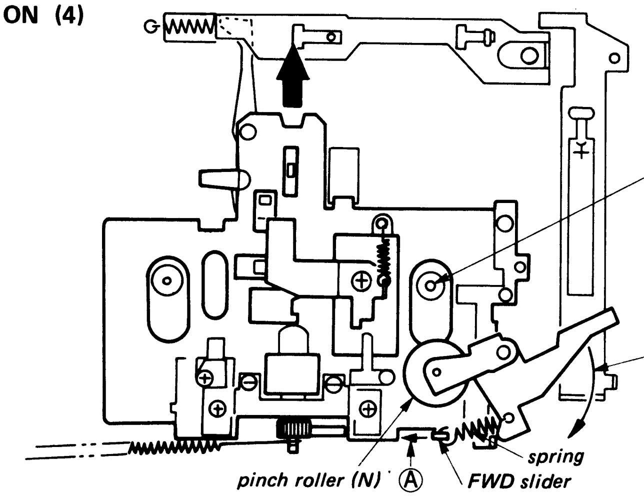
❾ *Operates simultaneously with Function ❹). When the head chassis is pushed up by Function ❸ , the take-up selection lever is pushed in the direction indicated by the arrow, to carry out functions ⓐ, ⓑ, and ⓒ in that order, and the take-up gear retainer rises.*

❻ *Operates simultaneously with Function ❹ . The pin that is integrated with the head chassis is shifted by ❸ in the direction indicated by the arrow, to release the FWD lock lever.*

❼ *The FWD lock lever is pulled in the direction indicated by the arrow by the tension of the spring, and attracted by the magnetic force of PM1.*

❽ *The FWD lock lever is supported by the section indicated by an asterik(※) by Function ❼ . Therefore, the head chassis rises.*

FWD OPERATION (4)

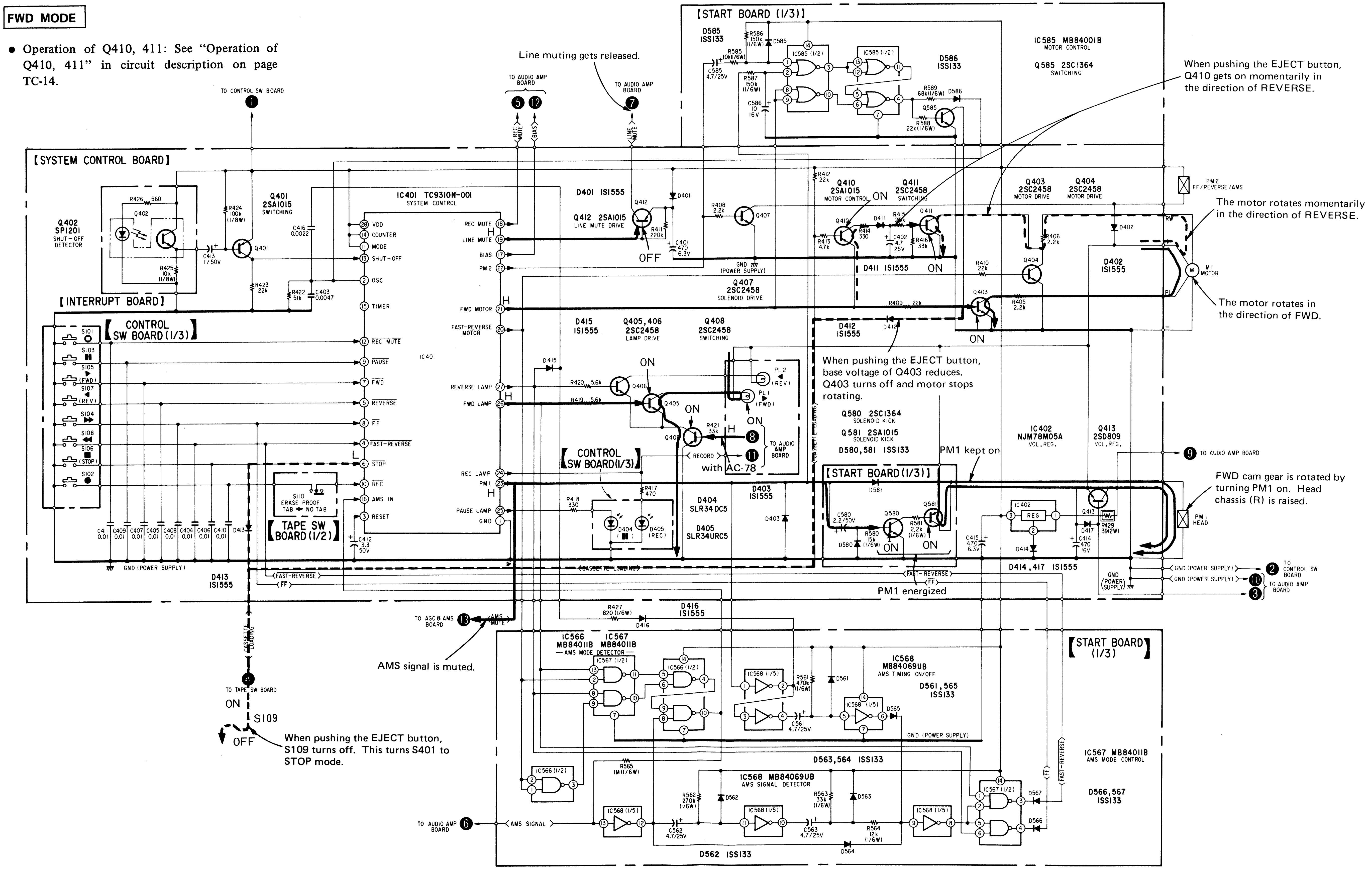

capstan
spring
pinch roller (N)
Ⓐ
FWD slider

⓬ *Operates simultaneously with Function ❺) The shifting of the FWD slider in the direction of the arrow by Function ❹ serves to make the pinch roller (N) turn in the direction of the arrow by the tension of the spring, and be pressed against the capstan.*

- **SIGNAL PATH**

FWD MODE

- Operation of Q410, 411: See "Operation of Q410, 411" in circuit description on page TC-14.


TO CONTROL SW BOARD
①
TO AUDIO AMP BOARD
⑤ ⑫
REC MUTE
BIAS
TO AUDIO AMP BOARD
⑦
LINE MUTE
[START BOARD (1/3)]
D585 ISS133
R586 150k (1/6W)
R585 10k(1/6W)
C585 4.7/25V
R587 150k (1/6W)
C586 10 16V
IC585 (1/2)
D586 ISS133
R589 68k(1/6W)
Q585
R588 22k(1/6W)
IC585 MB84001B MOTOR CONTROL
Q585 2SC1364 SWITCHING
[SYSTEM CONTROL BOARD]
Q402 SP1201 SHUT-OFF DETECTOR
R426 560
R425 10k (1/8W)
C413 1/50V
[INTERRUPT BOARD]
R424 100k (1/8W)
Q401 2SA1015 SWITCHING
R423 22k
C416 0.0022
R422 51k
C403 0.0047
IC401 TC9310N-001 SYSTEM CONTROL
VDD
COUNTER
MODE
SHUT-OFF
OSC
TIMER
REC MUTE
PAUSE
FWD
REVERSE
FF
FAST-REVERSE
STOP
REC
AMS IN
RESET
C412 3.3 50V
REC MUTE
LINE MUTE
BIAS
PM2
FWD MOTOR
FAST-REVERSE MOTOR
REVERSE LAMP
FWD LAMP
REC LAMP
PM1
PAUSE LAMP
GND
H
L
[CONTROL SW BOARD (1/3)]
S101
S103
S105 (FWD)
S107 (REV)
S104
S108
S106 (STOP)
S102
S110 ERASE PROOF TAB ← NO TAB
[TAPE SW BOARD (1/2)]
C411 0.01
C409 0.01
C407 0.01
C405 0.01
C408 0.01
C404 0.01
C406 0.01
C410 0.01
D413
GND (POWER SUPPLY)
D413 IS1555
D401 IS1555
Q412 2SA1015 LINE MUTE DRIVE
R411 220k
C401 470 6.3V
OFF
R408 2.2k
Q407
GND (POWER SUPPLY)
Q407 2SC2458 SOLENOID DRIVE
D415 IS1555
Q405,406 2SC2458 LAMP DRIVE
Q408 2SC2458 SWITCHING
R420 5.6k
R419 5.6k
ON
PL2 (REV)
PL1 (FWD)
R421 33k
⑧
TO AUDIO AMP BOARD
RECORD
⑪
with AC-78
[CONTROL SW BOARD(1/3)]
R418 330
R417 470
D404
D405 (REC)
D404 SLR34DC5
D405 SLR34URC5
D403 IS1555
R412 22k
Q410 2SA1015 MOTOR CONTROL
Q411 2SC2458 SWITCHING
D411
R415
R413 4.7k
R414 330
C402 4.7 25V
R416 33k
D411 IS1555
Q403 2SC2458 MOTOR DRIVE
Q404 2SC2458 MOTOR DRIVE
R406 2.2k
D402
D402 IS1555
R410 22k
R405 2.2k
R409 22k
PM2 FF/REVERSE/AMS
M1 MOTOR
D412 IS1555
Q580 2SC1364 SOLENOID KICK
Q581 2SA1015 SOLENOID KICK
D580,581 ISS133
IC402 NJM78M05A VOL. REG.
Q413 2SD809 VOL. REG.
⑨ TO AUDIO AMP BOARD
[START BOARD(1/3)]
D581
C580 2.2/50V
R580 15k (1/6W)
R581 2.2k (1/6W)
IC402 REG
C415 470 6.3V
D414
D417
R429 39(2W)
C414 470 16V
PM1 HEAD
D414,417 IS1555
GND (POWER) SUPPLY
GND (POWER SUPPLY)
② TO CONTROL SW BOARD
⑩ ③ TO AUDIO AMP BOARD
CASSETTE LOADING
FAST-REVERSE
FF
R427 820 (1/6W)
D416
D416 IS1555
TO AGC & AMS BOARD ⑬
AMS MUTE
IC566 MB84011B
IC567 MB84011B
— AMS MODE DETECTOR —
IC567 (1/2)
IC566 (1/2)
IC568 (1/5)
R561 470k (1/6W)
D561
IC568 MB84069UB AMS TIMING ON/OFF
D561,565 ISS133
C561 4.7/25V
D565
GND (POWER SUPPLY)
[START BOARD (1/3)]
IC567 MB84011B AMS MODE CONTROL
D566,567 ISS133
R565 1M(1/6W)
D563,564 ISS133
IC568 MB84069UB AMS SIGNAL DETECTOR
R562 270k (1/6W)
D562
R563 33k (1/6W)
D563
R564 12k (1/6W)
D567
D566
TO AUDIO AMP BOARD ⑥
AMS SIGNAL
C562 4.7/25V
C563 4.7/25V
D564
D562 ISS133
TO TAPE SW BOARD
ON
S109
OFF

Line muting gets released.

When pushing the EJECT button, Q410 gets on momentarily in the direction of REVERSE.

The motor rotates momentarily in the direction of REVERSE.

The motor rotates in the direction of FWD.

When pushing the EJECT button, base voltage of Q403 reduces. Q403 turns off and motor stops rotating.

PM1 kept on

FWD cam gear is rotated by turning PM1 on. Head chassis (R) is raised.

PM1 energized

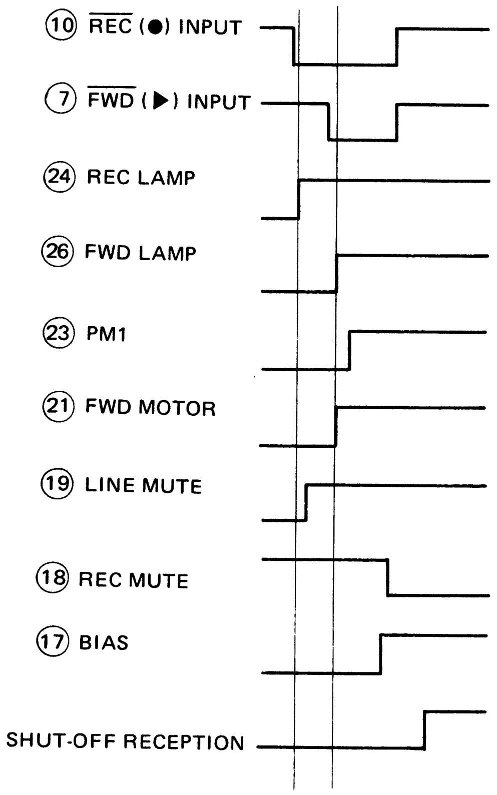
AMS signal is muted.

When pushing the EJECT button, S109 turns off. This turns S401 to STOP mode.

2-5. REC/FWD MODE

- **TIMING OF IC401**

STOP → REC FWD



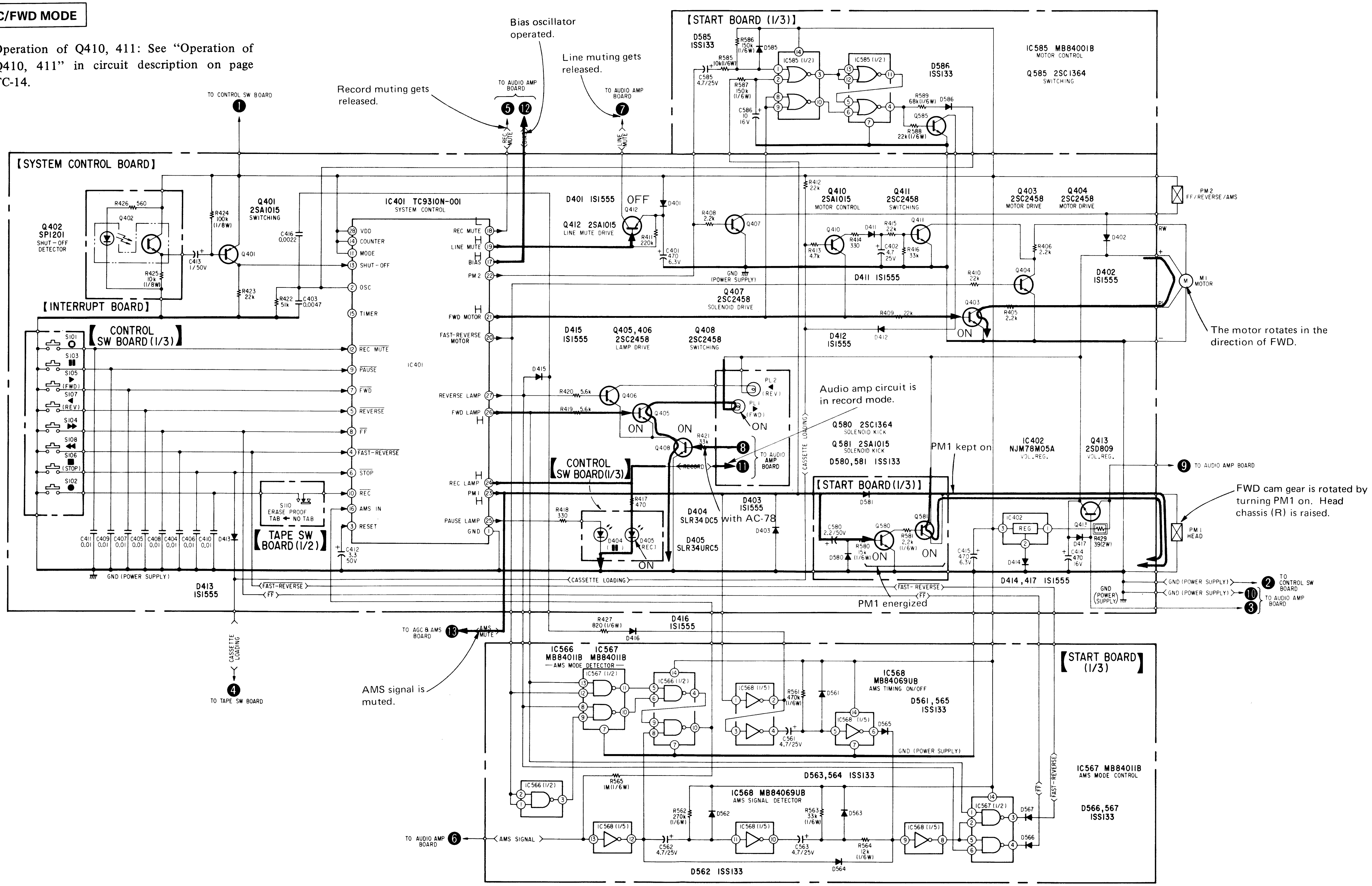
- **MECHANISM OPERATION**

The mechanism operation at this mode is the same as that at FWD mode.

• SIGNAL PATH

REC/FWD MODE

- Operation of Q410, 411: See "Operation of Q410, 411" in circuit description on page TC-14.



Bias oscillator operated.

Record muting gets released.

Line muting gets released.

The motor rotates in the direction of FWD.

Audio amp circuit is in record mode.

PM1 kept on

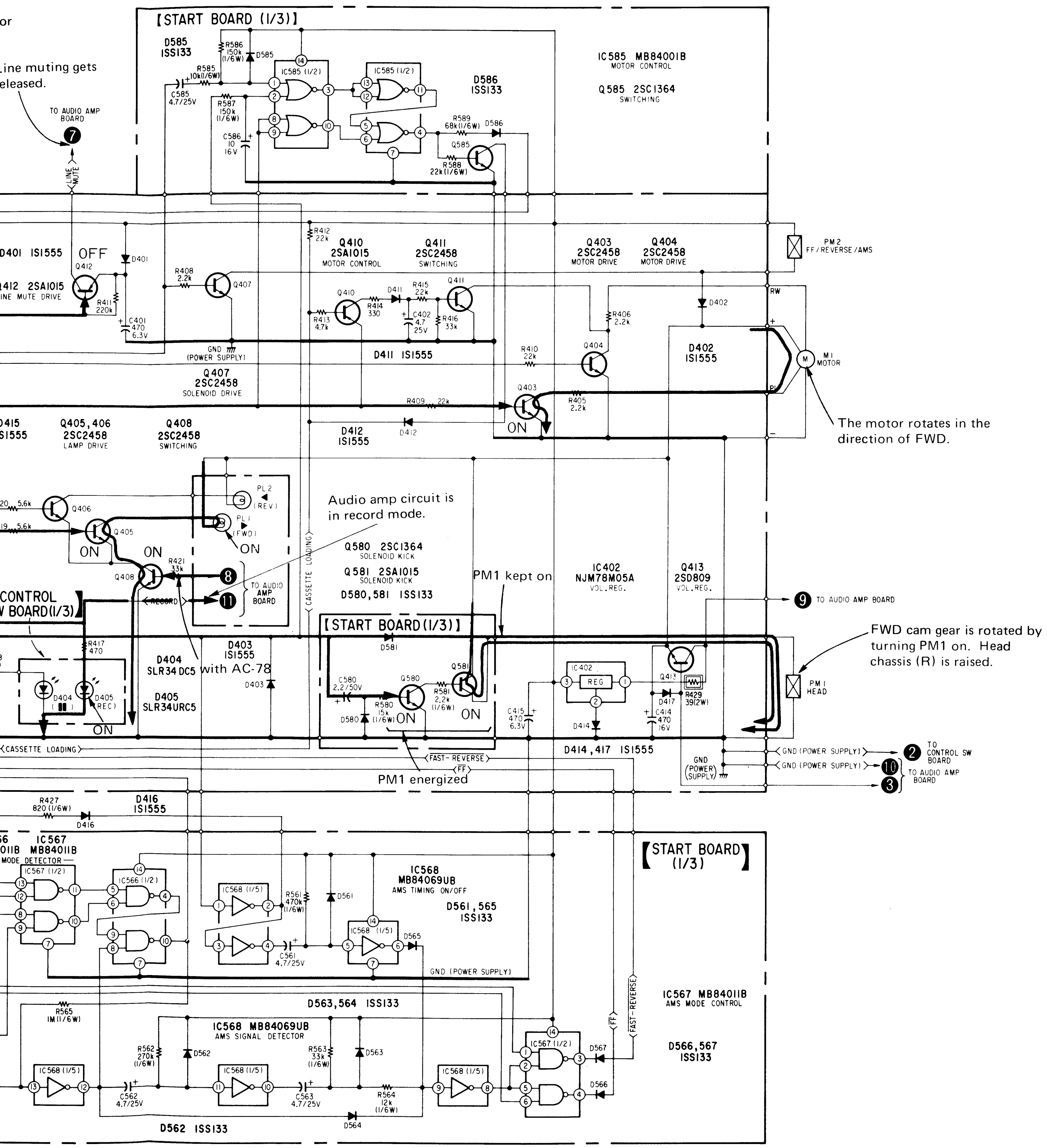
FWD cam gear is rotated by turning PM1 on. Head chassis (R) is raised.

PM1 energized

AMS signal is muted.

[SYSTEM CONTROL BOARD]
[INTERRUPT BOARD]
[CONTROL SW BOARD (1/3)]
[TAPE SW BOARD (1/2)]
[START BOARD (1/3)]
IC401 TC9310N-001 SYSTEM CONTROL
Q401 2SA1015 SWITCHING
Q402 SP1201 SHUT-OFF DETECTOR
D401 1S1555
Q412 2SA1015 LINE MUTE DRIVE
Q407 2SC2458 SOLENOID DRIVE
Q410 2SA1015 MOTOR CONTROL
Q411 2SC2458 SWITCHING
Q403 2SC2458 MOTOR DRIVE
Q404 2SC2458 MOTOR DRIVE
D402 1S1555
D411 1S1555
D412 1S1555
D415 1S1555
Q405,406 2SC2458 LAMP DRIVE
Q408 2SC2458 SWITCHING
D404 SLR34DC5
D405 SLR34URC5
D403 1S1555
with AC-78
Q580 2SC1364 SOLENOID KICK
Q581 2SA1015 SOLENOID KICK
D580,581 1SS133
IC402 NJM78M05A VOL.REG.
Q413 2SD809 VOL.REG.
D414,417 1S1555
IC585 MB84001B MOTOR CONTROL
Q585 2SC1364 SWITCHING
D585 1SS133
D586 1SS133
IC566 MB84011B
IC567 MB84011B
AMS MODE DETECTOR
IC568 MB84069UB AMS TIMING ON/OFF
D561,565 1SS133
D563,564 1SS133
IC568 MB84069UB AMS SIGNAL DETECTOR
D562 1SS133
IC567 MB84011B AMS MODE CONTROL
D566,567 1SS133
D413 1S1555
D416 1S1555
OFF
ON
M1 MOTOR
PM2 FF/REVERSE/AMS
PM1 HEAD
PL1 (FWD)
PL2 (REV)
S110 ERASE PROOF TAB ← NO TAB
S101 S103 S105 (FWD) S107 (REV) S104 S108 S106 (STOP) S102
REC MUTE
LINE MUTE
BIAS
PM 2
FWD MOTOR
FAST-REVERSE MOTOR
REVERSE LAMP
FWD LAMP
REC LAMP
PM 1
PAUSE LAMP
GND
VDD
COUNTER
MODE
SHUT-OFF
OSC
TIMER
PAUSE
FWD
REVERSE
FF
FAST-REVERSE
STOP
REC
AMS IN
RESET
TO CONTROL SW BOARD ①
TO AUDIO AMP BOARD ⑤ ⑫
TO AUDIO AMP BOARD ⑦
TO AUDIO AMP BOARD ⑧ ⑪
TO AUDIO AMP BOARD ⑨
TO CONTROL SW BOARD ②
TO AUDIO AMP BOARD ⑩ ③
TO AGC & AMS BOARD ⑬
TO TAPE SW BOARD ④
TO AUDIO AMP BOARD ⑥
CASSETTE LOADING
FAST-REVERSE
FF
AMS SIGNAL
AMS MUTE
GND (POWER SUPPLY)

2-6. REV
• TIM
STO
⑤ RE
㉗ RE
㉑ FW
㉓ PM
㉒ PM
⑲ LI
SHUT-O
• MECHA
REVERS


[START BOARD (1/3)]
D585 1SS133
IC585 MB84001B MOTOR CONTROL
Q585 2SC1364 SWITCHING
D586 1SS133
TO AUDIO AMP BOARD
LINE MUTE
D401 1S1555
OFF
Q412 2SA1015 LINE MUTE DRIVE
Q410 2SA1015 MOTOR CONTROL
Q411 2SC2458 SWITCHING
Q403 2SC2458 MOTOR DRIVE
Q404 2SC2458 MOTOR DRIVE
PM2 FF/REVERSE/AMS
D411 1S1555
D402 1S1555
M1 MOTOR
Q407 2SC2458 SOLENOID DRIVE
GND (POWER SUPPLY)
D415 1S1555
Q405,406 2SC2458 LAMP DRIVE
Q408 2SC2458 SWITCHING
D412 1S1555
ON
PL2 (REV)
PL1 (FWD)
TO AUDIO AMP BOARD
Q580 2SC1364 SOLENOID KICK
Q581 2SA1015 SOLENOID KICK
D580,581 1SS133
IC402 NJM78M05A VOL.REG.
Q413 2SD809 VOL.REG.
CONTROL SW BOARD (1/3)
D404 SLR34DC5
D403 1S1555
D405 SLR34URC5
[START BOARD (1/3)]
PM1 HEAD
D414,417 1S1555
TO AUDIO AMP BOARD
TO CONTROL SW BOARD
TO AUDIO AMP BOARD
CASSETTE LOADING
FAST-REVERSE
FF
R427 820(1/6W)
D416 1S1555
IC567 MB84011B AMS MODE DETECTOR
IC568 MB84069UB AMS TIMING ON/OFF
D561,565 1SS133
[START BOARD (1/3)]
IC567 MB84011B AMS MODE CONTROL
D566,567 1SS133
D563,564 1SS133
IC568 MB84069UB AMS SIGNAL DETECTOR
D562 1SS133

Line muting gets released.

The motor rotates in the direction of FWD.

Audio amp circuit is in record mode.

PM1 kept on

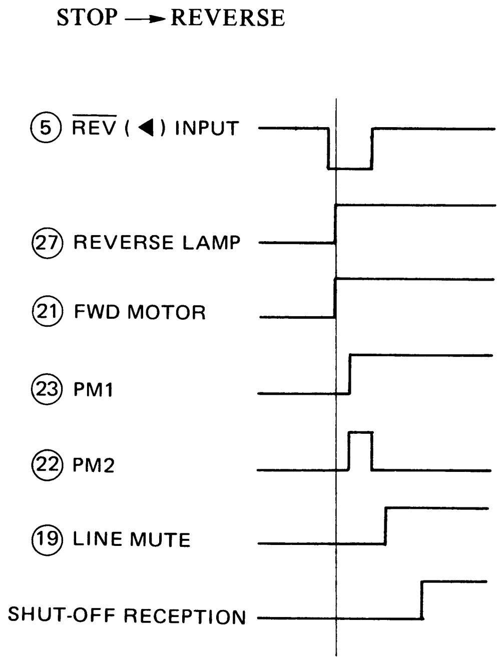
with AC-78

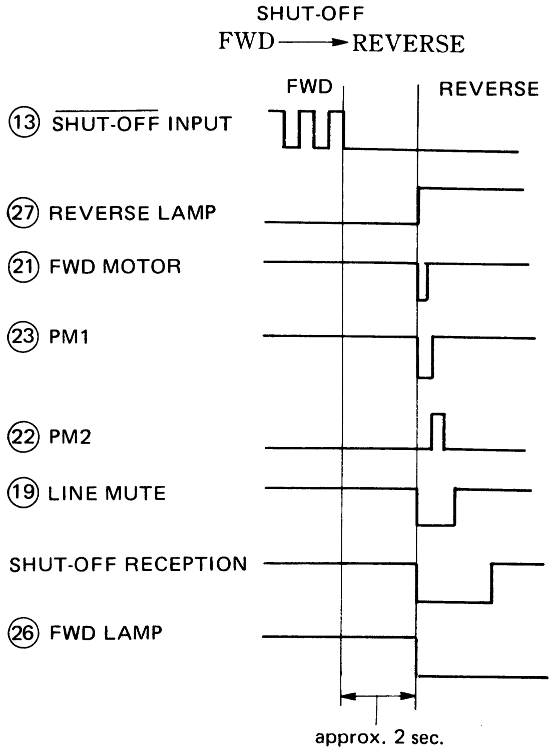
FWD cam gear is rotated by turning PM1 on. Head chassis (R) is raised.

PM1 energized

2-6. REV MODE

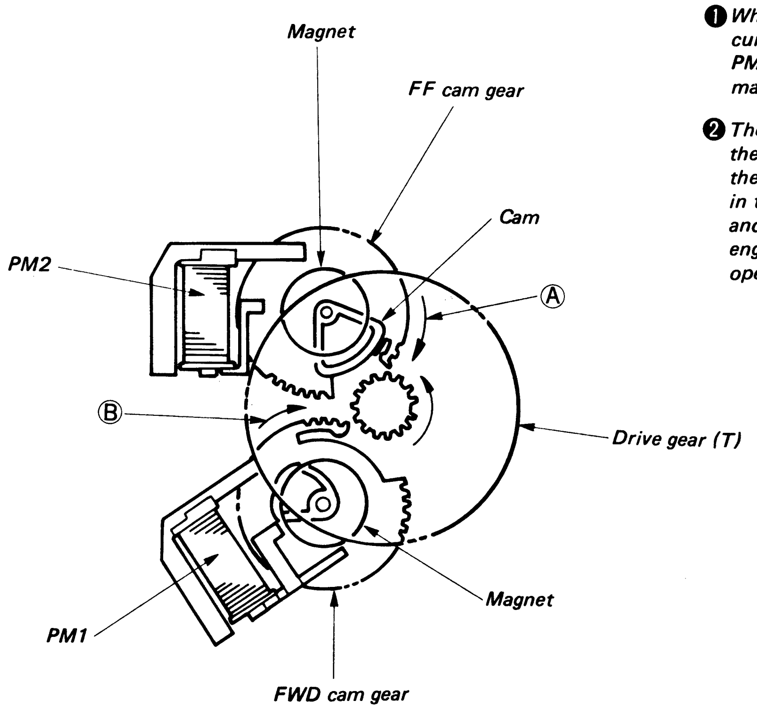
• TIMING OF IC401





• MECHANISM OPERATION

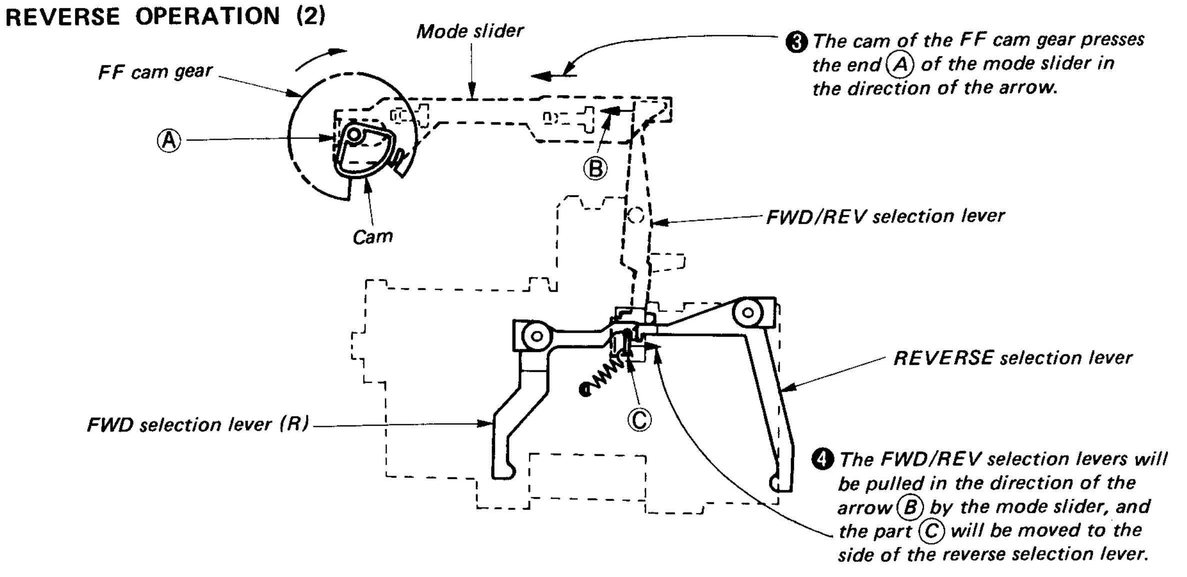
REVERSE OPERATION (1)


Magnet
FF cam gear
Cam
PM2
Ⓐ
Ⓑ
Drive gear (T)
Magnet
PM1
FWD cam gear

❶ *When the REV button is pressed, current flows in the coils PM1 and PM2 thus generating the respective magnetic fields.*

❷ *The FF cam gear will be thrown in the direction of the arrow Ⓐ and the FWD cam gear will be thrown in the direction of the arrow Ⓑ, and hence the drive gear will be engaged for the corresponding operation.*

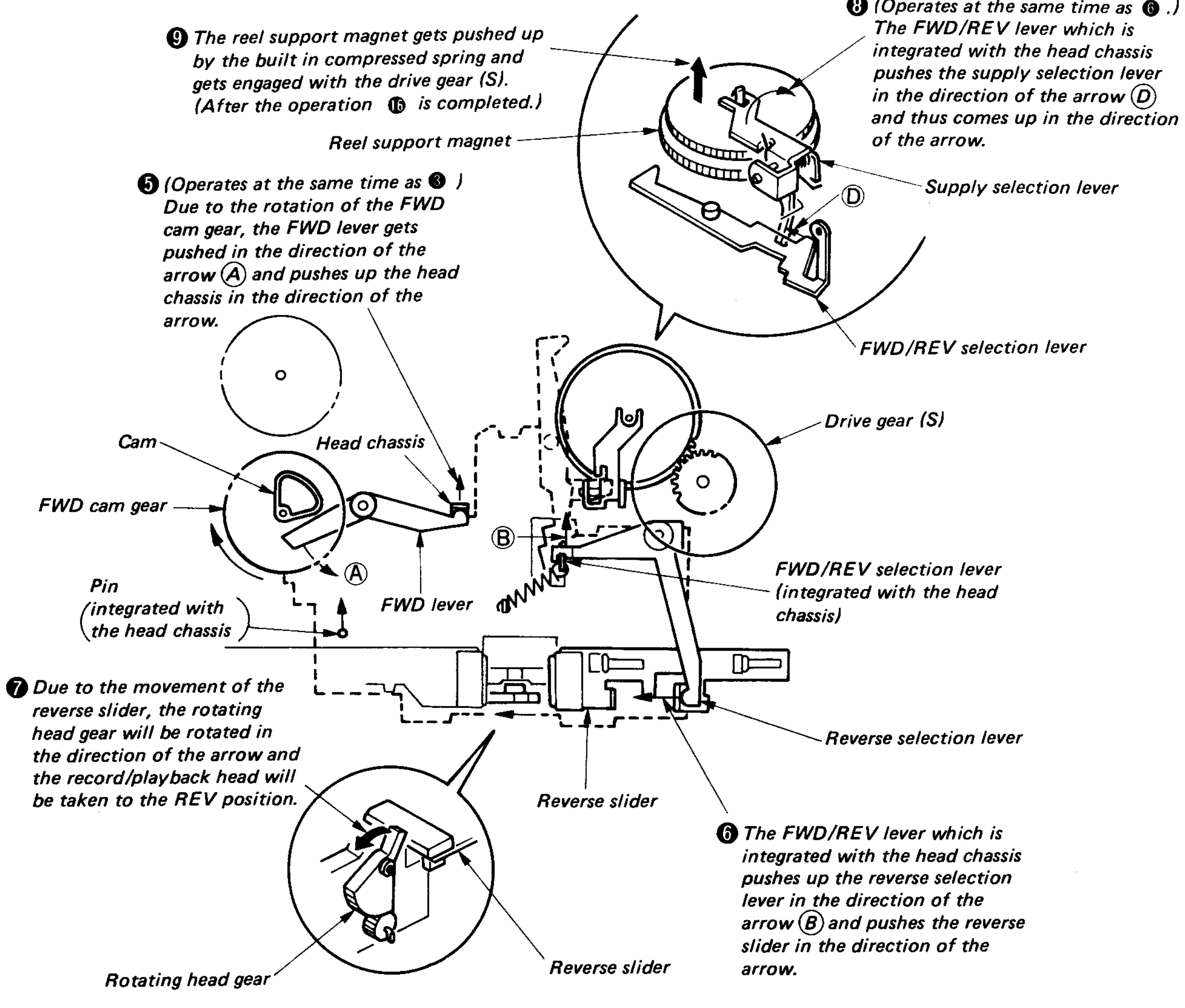
REVERSE OPERATION (2)


Mode slider
FF cam gear
Ⓐ
Cam
Ⓑ
FWD/REV selection lever
REVERSE selection lever
Ⓒ
FWD selection lever (R)

❸ *The cam of the FF cam gear presses the end Ⓐ of the mode slider in the direction of the arrow.*

❹ *The FWD/REV selection levers will be pulled in the direction of the arrow Ⓑ by the mode slider, and the part Ⓒ will be moved to the side of the reverse selection lever.*

REVERSE OPERATION (3)


Reel support magnet
Supply selection lever
Ⓓ
FWD/REV selection lever
Drive gear (S)
Cam
Head chassis
FWD cam gear
Ⓐ
Ⓑ
Pin (integrated with the head chassis)
FWD lever
FWD/REV selection lever (integrated with the head chassis)
Reverse selection lever
Reverse slider
Rotating head gear
Reverse slider

❾ *The reel support magnet gets pushed up by the built in compressed spring and gets engaged with the drive gear (S). (After the operation ⓰ is completed.)*

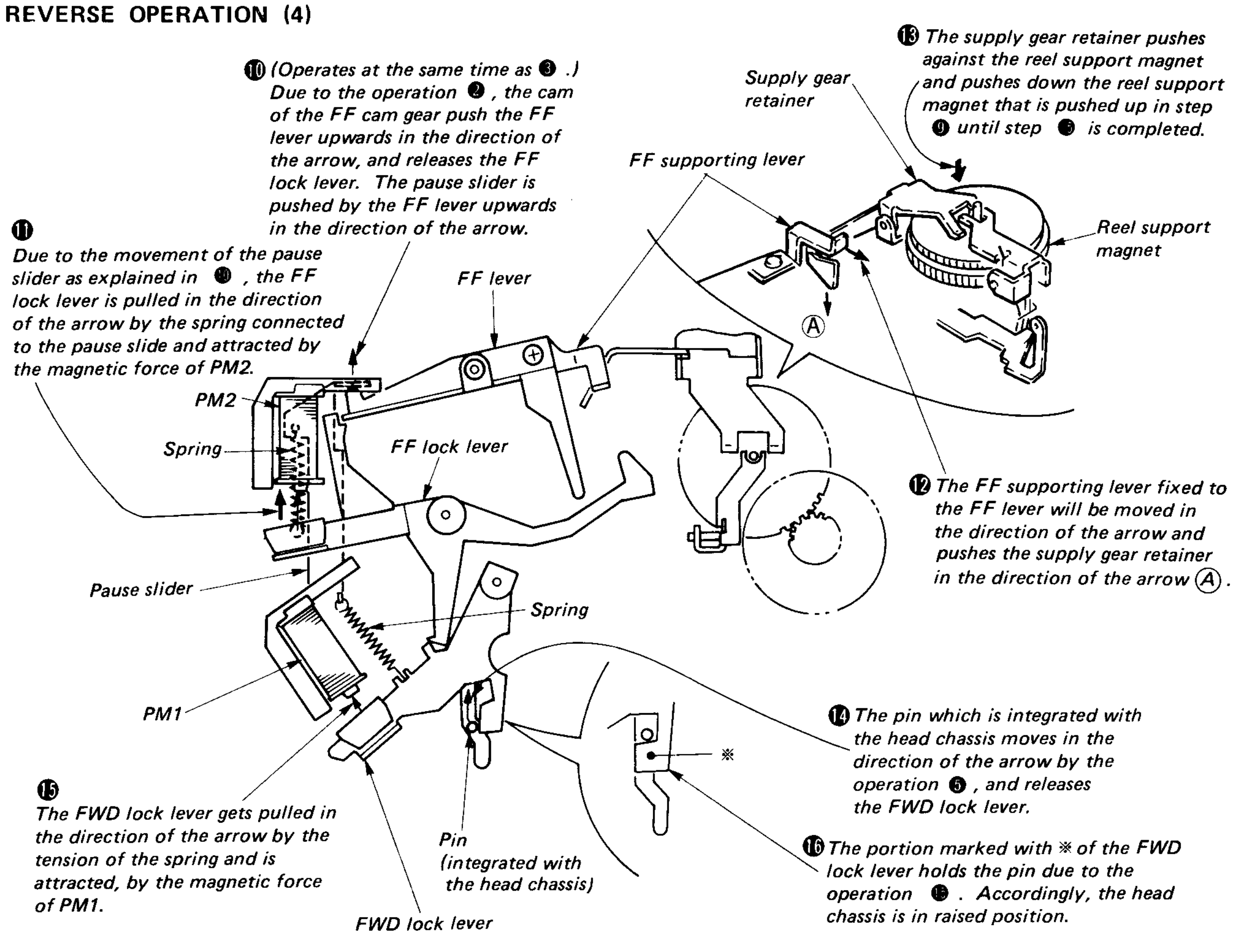
❽ *(Operates at the same time as ❻ .) The FWD/REV lever which is integrated with the head chassis pushes the supply selection lever in the direction of the arrow Ⓓ and thus comes up in the direction of the arrow.*

❺ *(Operates at the same time as ❸) Due to the rotation of the FWD cam gear, the FWD lever gets pushed in the direction of the arrow Ⓐ and pushes up the head chassis in the direction of the arrow.*

❼ *Due to the movement of the reverse slider, the rotating head gear will be rotated in the direction of the arrow and the record/playback head will be taken to the REV position.*

❻ *The FWD/REV lever which is integrated with the head chassis pushes up the reverse selection lever in the direction of the arrow Ⓑ and pushes the reverse slider in the direction of the arrow.*

REVERSE OPERATION (4)


Supply gear retainer
FF supporting lever
Reel support magnet
Ⓐ
FF lever
PM2
Spring
FF lock lever
Pause slider
Spring
PM1
Pin (integrated with the head chassis)
FWD lock lever
※

⓾ *(Operates at the same time as ❸ .) Due to the operation ❷ , the cam of the FF cam gear push the FF lever upwards in the direction of the arrow, and releases the FF lock lever. The pause slider is pushed by the FF lever upwards in the direction of the arrow.*

⓫ *Due to the movement of the pause slider as explained in ⓾ , the FF lock lever is pulled in the direction of the arrow by the spring connected to the pause slide and attracted by the magnetic force of PM2.*

⓭ *The supply gear retainer pushes against the reel support magnet and pushes down the reel support magnet that is pushed up in step ❾ until step ⓯ is completed.*

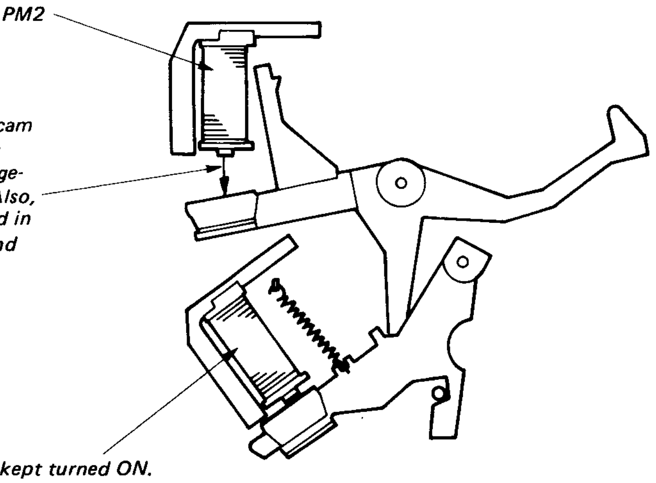
⓬ *The FF supporting lever fixed to the FF lever will be moved in the direction of the arrow and pushes the supply gear retainer in the direction of the arrow Ⓐ .*

⓮ *The pin which is integrated with the head chassis moves in the direction of the arrow by the operation ❺ , and releases the FWD lock lever.*

⓯ *The FWD lock lever gets pulled in the direction of the arrow by the tension of the spring and is attracted, by the magnetic force of PM1.*

⓰ *The portion marked with ※ of the FWD lock lever holds the pin due to the operation ⓯ . Accordingly, the head chassis is in raised position.*

REVERSE OPERATION (5)



⓱ *PM2 goes OFF and the FF cam gear rotates by the one turn and gets released from engagement with the drive gear. Also, the supply gear retainer held in step ⓭ will get released and the reel support magnet in step ❾ will be rotated by the drive gear (S).*

PM1 kept turned ON.

REVE

⓲
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the arro
the spri
capstan

vill

d

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ch is
chassis
on lever
ow Ⓓ
direction

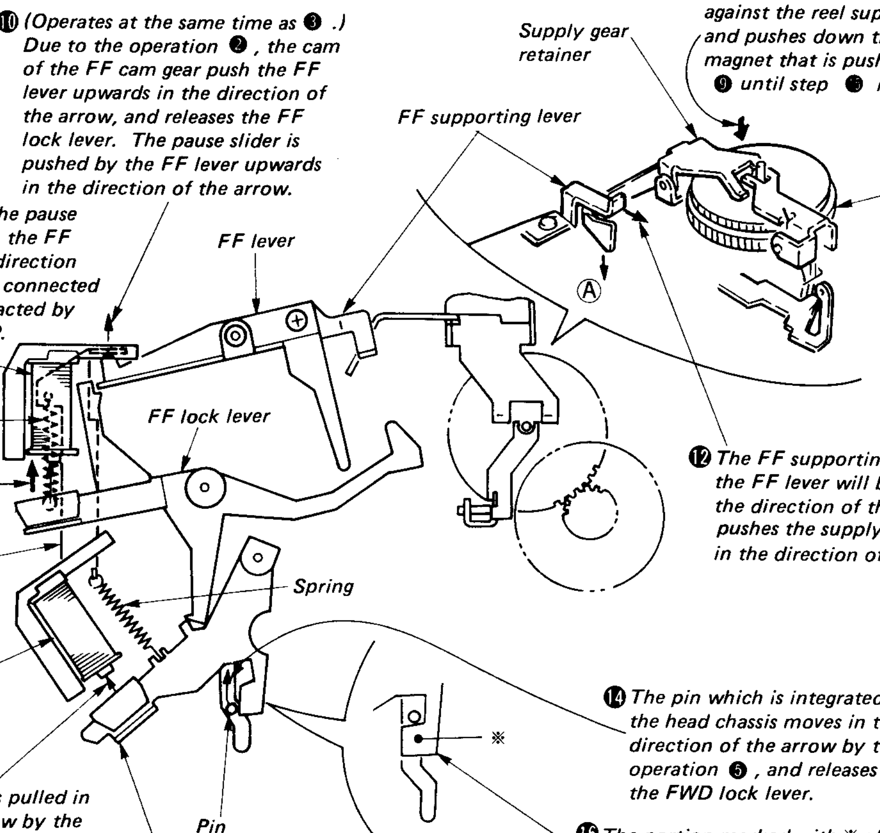
er

REVERSE OPERATION (4)

❿ (Operates at the same time as ❸ .) Due to the operation ❷ , the cam of the FF cam gear push the FF lever upwards in the direction of the arrow, and releases the FF lock lever. The pause slider is pushed by the FF lever upwards in the direction of the arrow.

⓫ Due to the movement of the pause slider as explained in ❿ , the FF lock lever is pulled in the direction of the arrow by the spring connected to the pause slide and attracted by the magnetic force of PM2.

⓭ The supply gear retainer pushes against the reel support magnet and pushes down the reel support magnet that is pushed up in step ❾ until step ⓯ is completed.


Supply gear retainer
FF supporting lever
Reel support magnet
FF lever
Ⓐ
PM2
Spring
FF lock lever
Pause slider
Spring
PM1
※
Pin (integrated with the head chassis)
FWD lock lever

⓬ The FF supporting lever fixed to the FF lever will be moved in the direction of the arrow and pushes the supply gear retainer in the direction of the arrow Ⓐ .

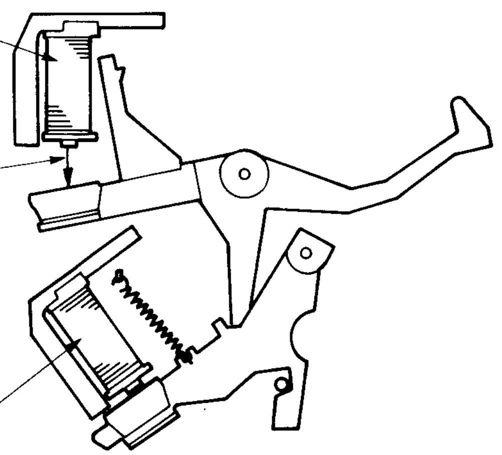
⓮ The pin which is integrated with the head chassis moves in the direction of the arrow by the operation ❺ , and releases the FWD lock lever.

⓯ The FWD lock lever gets pulled in the direction of the arrow by the tension of the spring and is attracted, by the magnetic force of PM1.

⓰ The portion marked with ※ of the FWD lock lever holds the pin due to the operation ⓯ . Accordingly, the head chassis is in raised position.

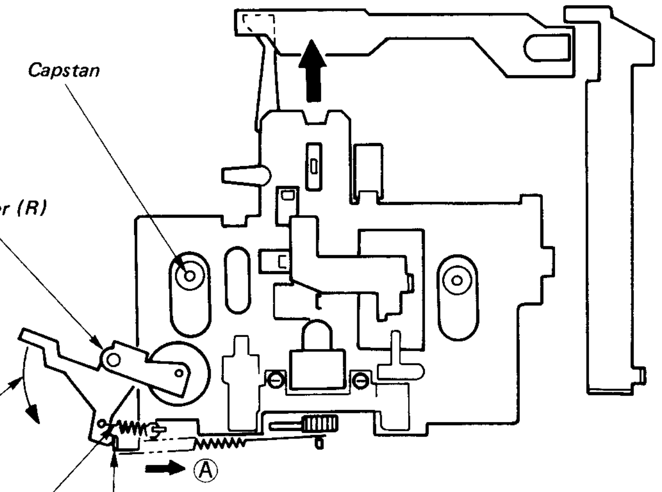
REVERSE OPERATION (5)

⓱ PM2 goes OFF and the FF cam gear rotates by the one turn and gets released from engagement with the drive gear. Also, the supply gear retainer held in step ⓭ will get released and the reel support magnet in step ❾ will be rotated by the drive gear (S).


PM2
PM1 kept turned ON.

REVERSE OPERATION (6)

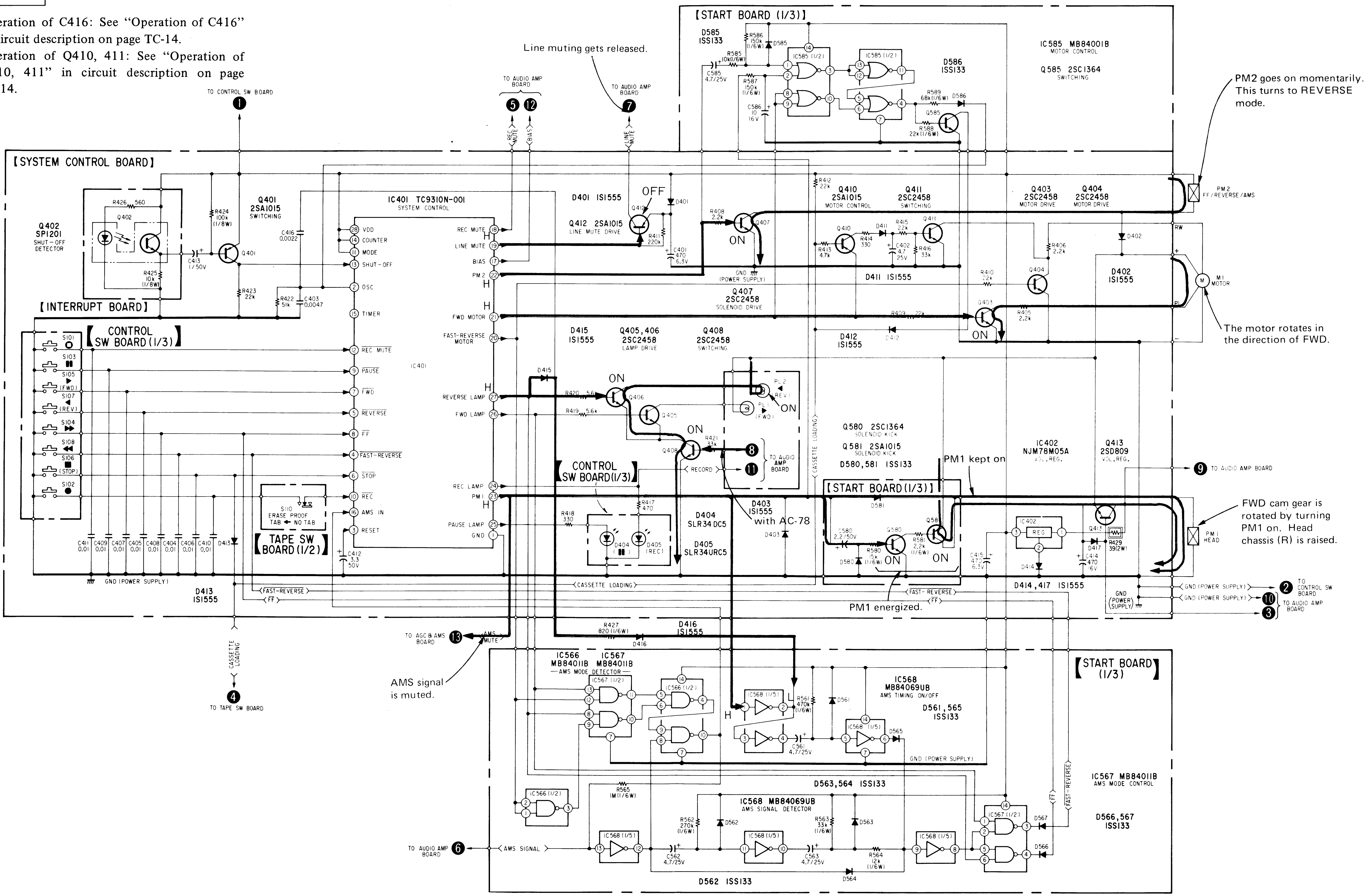
⓲ (Operates at the same time as step ❼ .) When the reverse slider moves in the direction Ⓐ in step ❻ , the pinch roller (R) tilts in the direction of the arrow due to the tension force of the spring and presses against the capstan.


Capstan
Pinch roller (R)
Ⓐ
Spring
Reverse slider

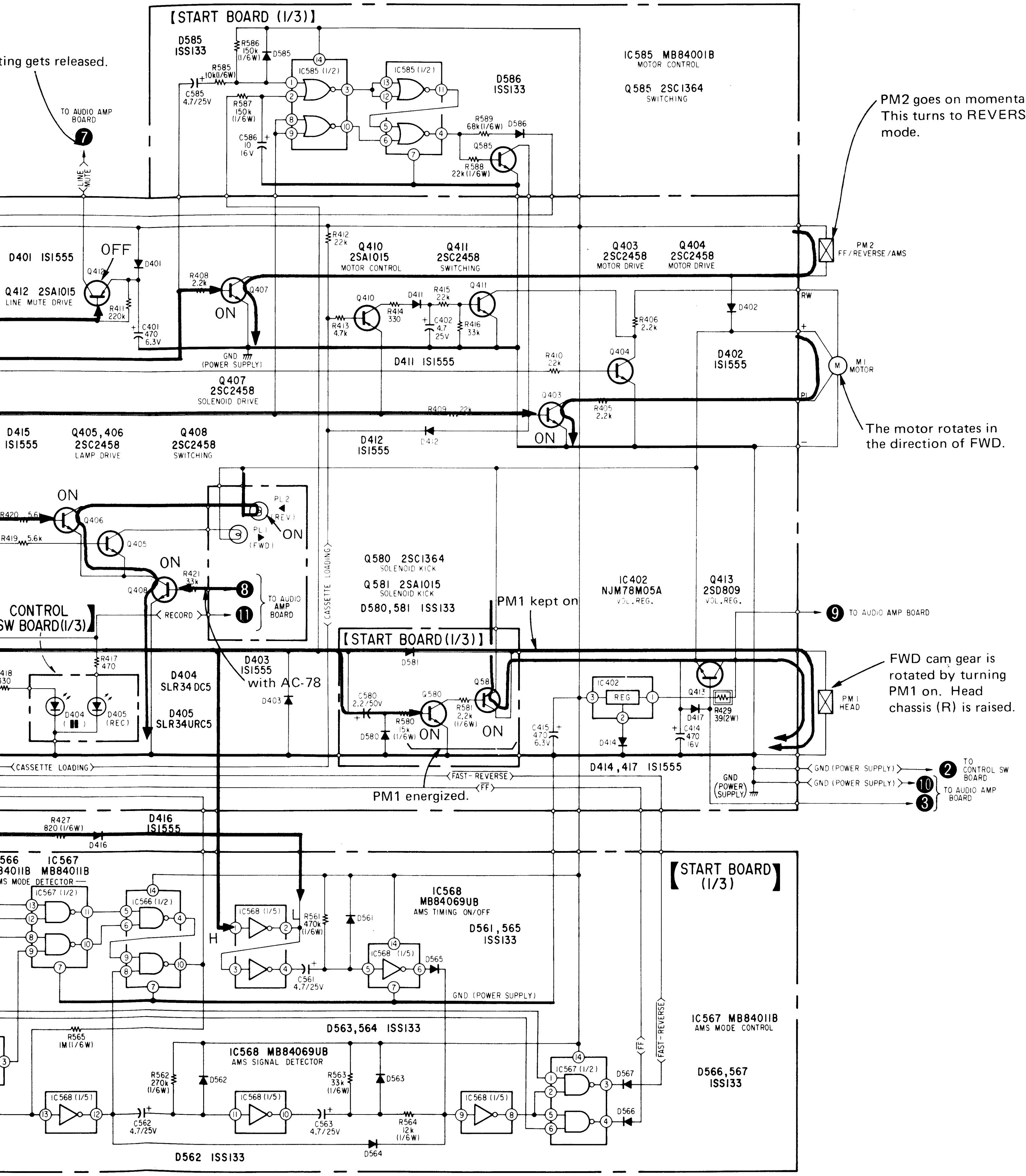
- **SIGNAL PATH**

REV MODE

- Operation of C416: See "Operation of C416" in circuit description on page TC-14.
- Operation of Q410, 411: See "Operation of Q410, 411" in circuit description on page TC-14.


TO CONTROL SW BOARD
TO AUDIO AMP BOARD
Line muting gets released.
TO AUDIO AMP BOARD
[SYSTEM CONTROL BOARD]
[INTERRUPT BOARD]
Q402 SP1201 SHUT-OFF DETECTOR
Q401 2SA1015 SWITCHING
IC401 TC9310N-001 SYSTEM CONTROL
D401 1S1555
Q412 2SA1015 LINE MUTE DRIVE
OFF
ON
Q407 2SC2458 SOLENOID DRIVE
[START BOARD (1/3)]
D585 1SS133
D586 1SS133
IC585 MB84001B MOTOR CONTROL
Q585 2SC1364 SWITCHING
PM2 goes on momentarily. This turns to REVERSE mode.
PM2 FF/REVERSE/AMS
Q410 2SA1015 MOTOR CONTROL
Q411 2SC2458 SWITCHING
Q403 2SC2458 MOTOR DRIVE
Q404 2SC2458 MOTOR DRIVE
D411 1S1555
D402 1S1555
M1 MOTOR
The motor rotates in the direction of FWD.
D412 1S1555
[CONTROL SW BOARD (1/3)]
S101 S103 S105 (FWD) S107 (REV) S104 S108 S106 (STOP) S102
D415 1S1555
Q405,406 2SC2458 LAMP DRIVE
Q408 2SC2458 SWITCHING
PL2 REV
PL1 FWD
[CONTROL SW BOARD (1/3)]
D404 SLR34DC5
D405 SLR34URC5
D403 1S1555 with AC-78
TO AUDIO AMP BOARD
Q580 2SC1364 SOLENOID KICK
Q581 2SA1015 SOLENOID KICK
D580,581 1SS133
PM1 kept on
IC402 NJM78M05A VOL.REG.
Q413 2SD809 VOL.REG.
TO AUDIO AMP BOARD
FWD cam gear is rotated by turning PM1 on. Head chassis (R) is raised.
PM1 HEAD
S110 ERASE PROOF TAB ← NO TAB
[TAPE SW BOARD (1/2)]
D413 1S1555
D414,417 1S1555
PM1 energized.
TO CONTROL SW BOARD
TO AUDIO AMP BOARD
TO AGC & AMS BOARD
AMS signal is muted.
D416 1S1555
IC566 MB84011B
IC567 MB84011B
AMS MODE DETECTOR
IC568 MB84069UB AMS TIMING ON/OFF
D561,565 1SS133
[START BOARD (1/3)]
TO TAPE SW BOARD
D563,564 1SS133
IC568 MB84069UB AMS SIGNAL DETECTOR
IC567 MB84011B AMS MODE CONTROL
D566,567 1SS133
TO AUDIO AMP BOARD
AMS SIGNAL
D562 1SS133
GND (POWER SUPPLY)

2-7. FWD
• TI
ST
(A
ST
⑦
⑧
㉖
㉑
㉓
㉒
⑲
SHUT-O
AMS SIG
F
⑯
㉖
㉑
㉓
㉒
⑲
SHUT-OF

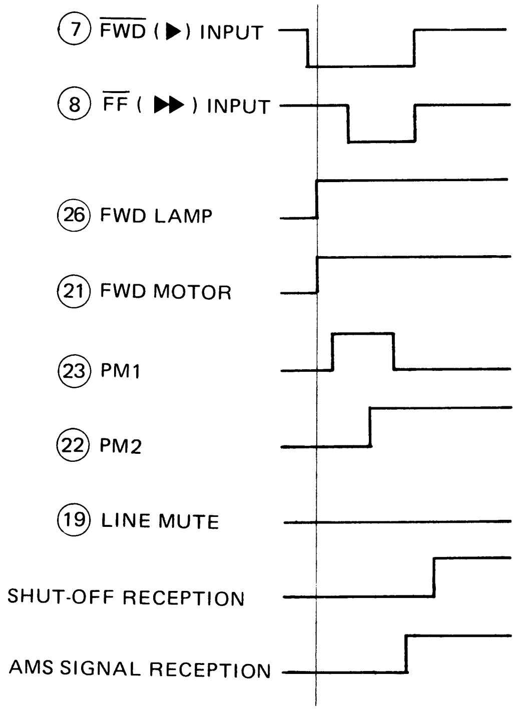


ting gets released.
TO AUDIO AMP BOARD
7
LINE MUTE
[START BOARD (1/3)]
D585 1SS133
IC585 MB84001B MOTOR CONTROL
Q585 2SC1364 SWITCHING
D586 1SS133
PM2 goes on momentarily. This turns to REVERSE mode.
PM2 FF/REVERSE/AMS
D401 1S1555
OFF
Q412 2SA1015 LINE MUTE DRIVE
ON
Q410 2SA1015 MOTOR CONTROL
Q411 2SC2458 SWITCHING
Q403 2SC2458 MOTOR DRIVE
Q404 2SC2458 MOTOR DRIVE
GND (POWER SUPPLY)
Q407 2SC2458 SOLENOID DRIVE
D411 1S1555
D402 1S1555
M1 MOTOR
The motor rotates in the direction of FWD.
D415 1S1555
Q405,406 2SC2458 LAMP DRIVE
Q408 2SC2458 SWITCHING
D412 1S1555
ON
ON
PL2 REV
PL1 FWD
ON
8
11
TO AUDIO AMP BOARD
RECORD
CONTROL SW BOARD(1/3)
CASSETTE LOADING
Q580 2SC1364 SOLENOID KICK
Q581 2SA1015 SOLENOID KICK
D580,581 1SS133
PM1 kept on
IC402 NJM78M05A V.REG.
Q413 2SD809 V.REG.
9 TO AUDIO AMP BOARD
D403 1S1555 with AC-78
D404 SLR34DC5
D405 SLR34URC5
[START BOARD(1/3)]
ON
ON
FWD cam gear is rotated by turning PM1 on. Head chassis (R) is raised.
PM1 HEAD
D414,417 1S1555
FAST-REVERSE
FF
PM1 energized.
GND (POWER SUPPLY)
2 TO CONTROL SW BOARD
10
3 TO AUDIO AMP BOARD
D416 1S1555
IC566 IC567 MB84011B AMS MODE DETECTOR
H
IC568 MB84069UB AMS TIMING ON/OFF
D561,565 1SS133
[START BOARD (1/3)]
IC567 MB84011B AMS MODE CONTROL
D566,567 1SS133
D563,564 1SS133
IC568 MB84069UB AMS SIGNAL DETECTOR
D562 1SS133

2-7. FWD AMS MODE

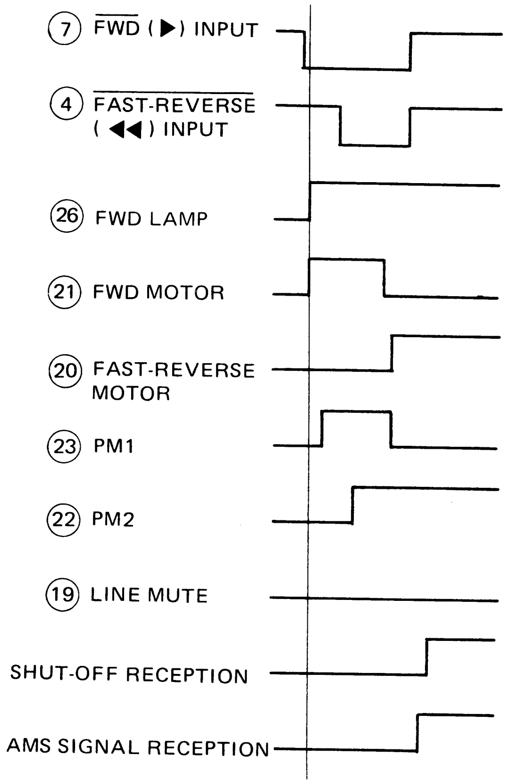
- **TIMING OF IC401**

STOP ——► FF AMS
(AMS KEY INPUT OPERATION FROM STOP MODE)



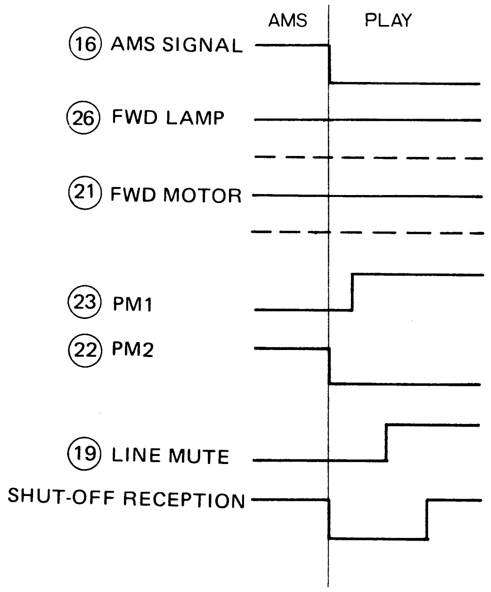
⑦ FWD (▶) INPUT
⑧ FF (▶▶) INPUT
㉖ FWD LAMP
㉑ FWD MOTOR
㉓ PM1
㉒ PM2
⑲ LINE MUTE
SHUT-OFF RECEPTION
AMS SIGNAL RECEPTION

STOP ——► FAST-REVERSE AMS
(AMS KEY INPUT OPERATION FROM STOP MODE)



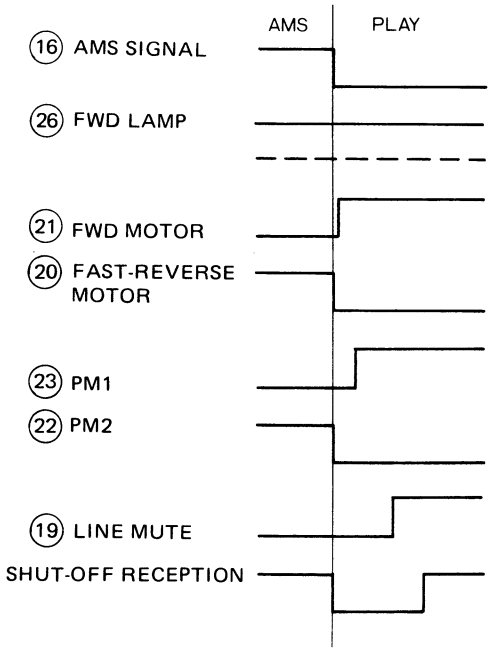
⑦ FWD (▶) INPUT
④ FAST-REVERSE (◀◀) INPUT
㉖ FWD LAMP
㉑ FWD MOTOR
⑳ FAST-REVERSE MOTOR
㉓ PM1
㉒ PM2
⑲ LINE MUTE
SHUT-OFF RECEPTION
AMS SIGNAL RECEPTION

FF AMS SIGNAL RECEPTION



AMS
PLAY
⑯ AMS SIGNAL
㉖ FWD LAMP
㉑ FWD MOTOR
㉓ PM1
㉒ PM2
⑲ LINE MUTE
SHUT-OFF RECEPTION

FAST-REVERSE AMS SIGNAL RECEPTION

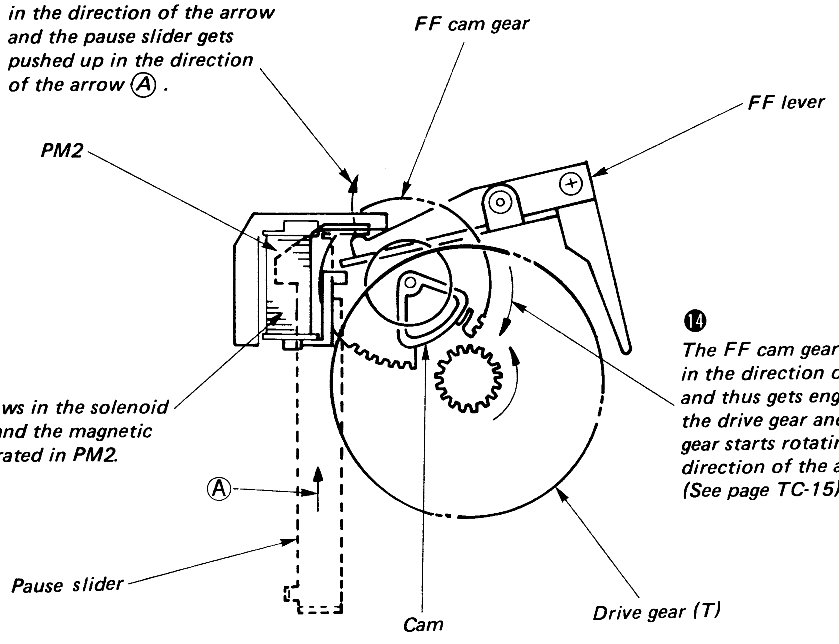


AMS
PLAY
⑯ AMS SIGNAL
㉖ FWD LAMP
㉑ FWD MOTOR
⑳ FAST-REVERSE MOTOR
㉓ PM1
㉒ PM2
⑲ LINE MUTE
SHUT-OFF RECEPTION

- **MECHANISM OPERATION**

Operation of ❶ – ⓬ : See "Operation of FWD mode" on page TC23 – 24.

FWD AMS OPERATION (5)

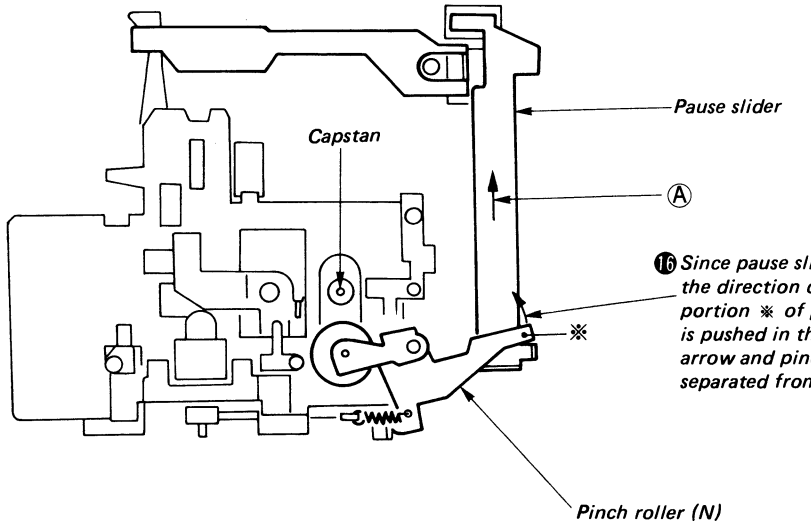

FF cam gear
FF lever
PM2
Ⓐ
Pause slider
Cam
Drive gear (T)

⓯ The FF lever gets pushed by the cam of the FF cam gear in the direction of the arrow and the pause slider gets pushed up in the direction of the arrow Ⓐ.

⓮ The FF cam gear gets thrown in the direction of the arrow and thus gets engaged with the drive gear and the FF cam gear starts rotating in the direction of the arrow. (See page TC-15)

⓭ A current flows in the solenoid coil of PM2 and the magnetic force is generated in PM2.

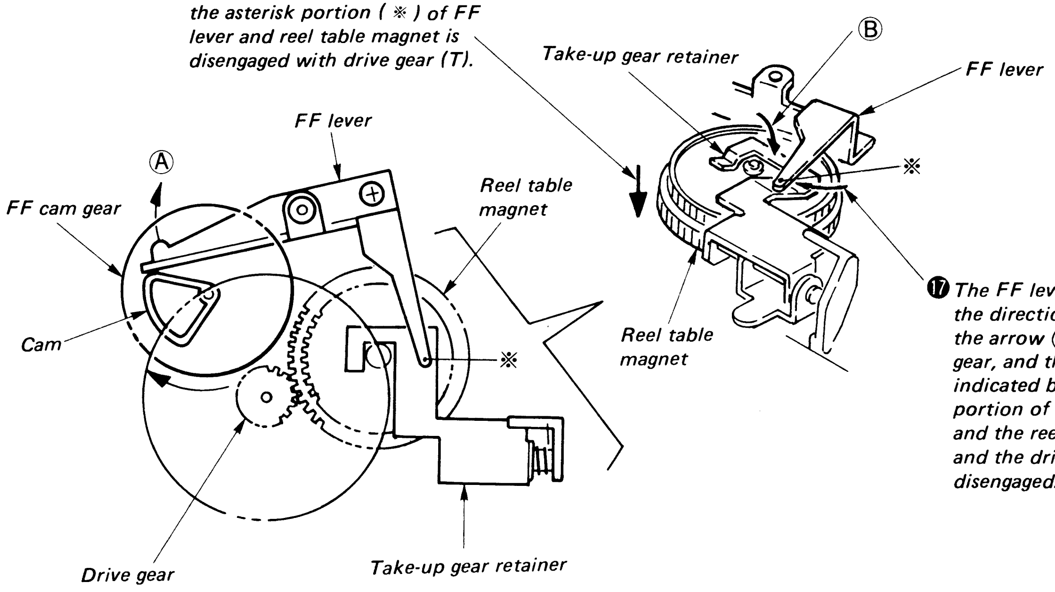
FWD AMS OPERATION (6)


Capstan
Pause slider
Ⓐ
※
Pinch roller (N)

⓰ Since pause slider is moved in the direction of Ⓐ, marked portion ※ of pinch roller (N) is pushed in the direction of arrow and pinch roller (N) is separated from capstan.

FWD AMS OPERATION (7)

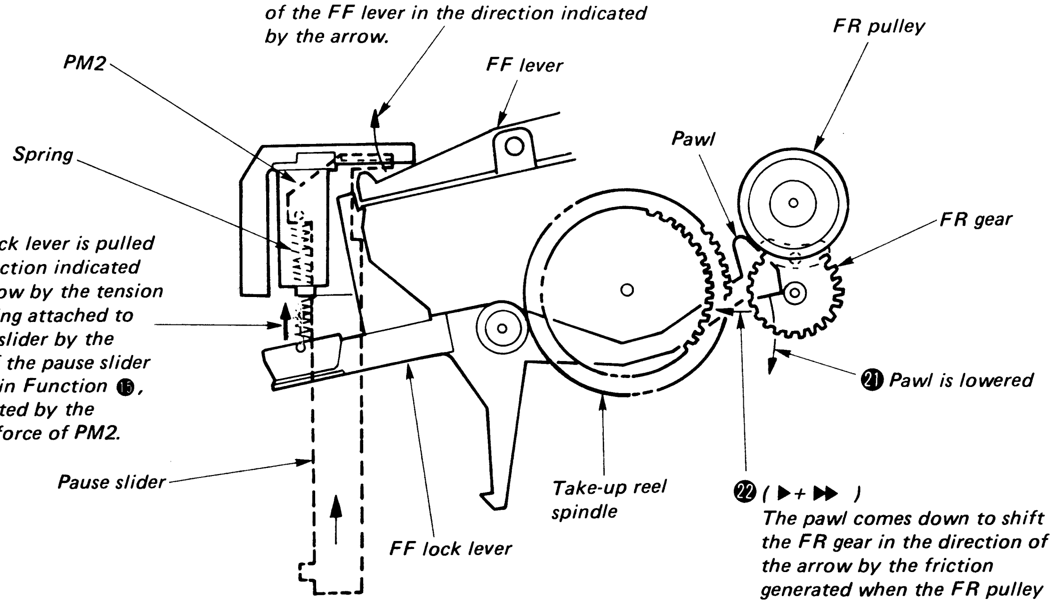
⓲ Take-up reel retainer is pushed in the direction of an the arrow Ⓑ by the asterisk portion (※) of FF lever and reel table magnet is disengaged with drive gear (T).


Take-up gear retainer
Ⓑ
FF lever
FF lever
Ⓐ
FF cam gear
Reel table magnet
※
Cam
Reel table magnet
※
Drive gear
Take-up gear retainer

⓱ The FF lever is pushed in the direction indicated by the arrow Ⓐ by the FF cam gear, and the section indicated by the asterik (※) portion of the FF lever, and the reel table magnet and the drive gear (T) are disengaged.

FWD AMS OPERATION (8)

⓳ Operates simultaneously with Function ⓯. The FF lock lever is released by the turning of the FF lever in the direction indicated by the arrow.


PM2
FF lever
FR pulley
Spring
Pawl
FR gear
Pause slider
Take-up reel spindle
FF lock lever

⓴ The FF lock lever is pulled in the direction indicated by the arrow by the tension of the spring attached to the pause slider by the shifting of the pause slider described in Function ⓯, and attracted by the magnetic force of PM2.

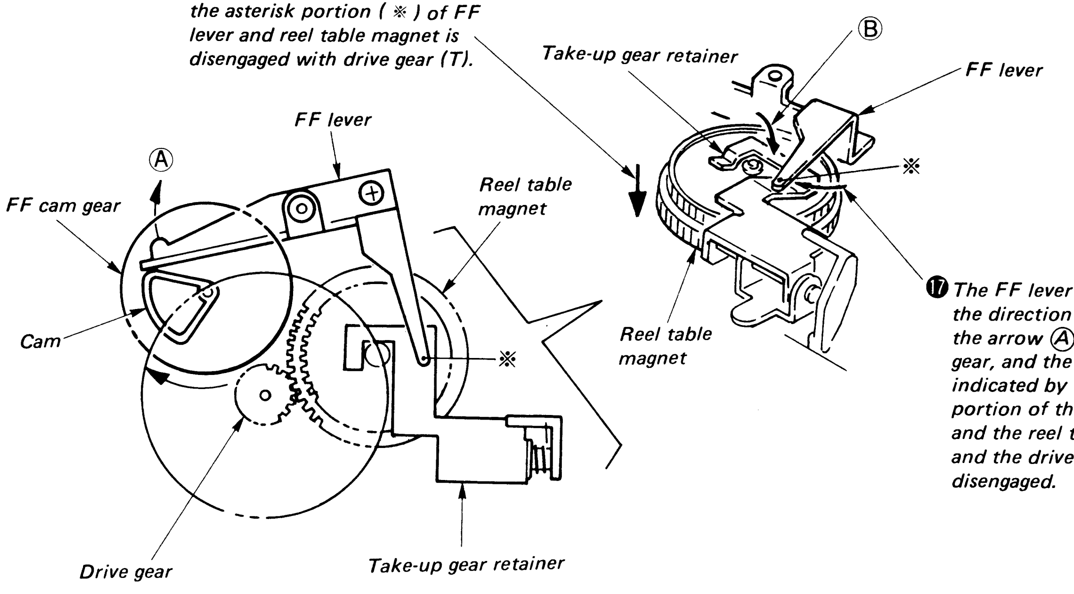
㉑ Pawl is lowered

㉒ (▶+▶▶)
The pawl comes down to shift the FR gear in the direction of the arrow by the friction generated when the FR pulley is turning, to turn the take-up reel table.

FWD AM

FWD AMS OPERATION (7)

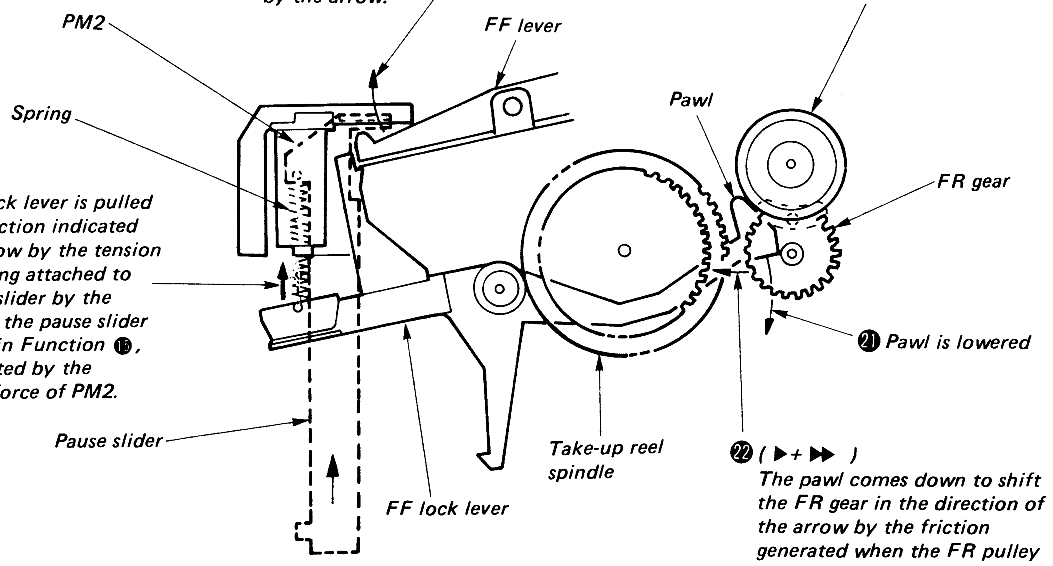
⑱ *Take-up reel retainer is pushed in the direction of an the arrow Ⓑ by the asterisk portion (※) of FF lever and reel table magnet is disengaged with drive gear (T).*


Take-up gear retainer
Ⓑ
FF lever
FF lever
Ⓐ
FF cam gear
Reel table magnet
※
Cam
※
Reel table magnet
Drive gear
Take-up gear retainer

⑰ *The FF lever is pushed in the direction indicated by the arrow Ⓐ by the FF cam gear, and the section indicated by the asterik (※) portion of the FF lever, and the reel table magnet and the drive gear (T) are disengaged.*

FWD AMS OPERATION (8)

⑲ *Operates simultaneously with Function ⑮ . The FF lock lever is released by the turning of the FF lever in the direction indicated by the arrow.*

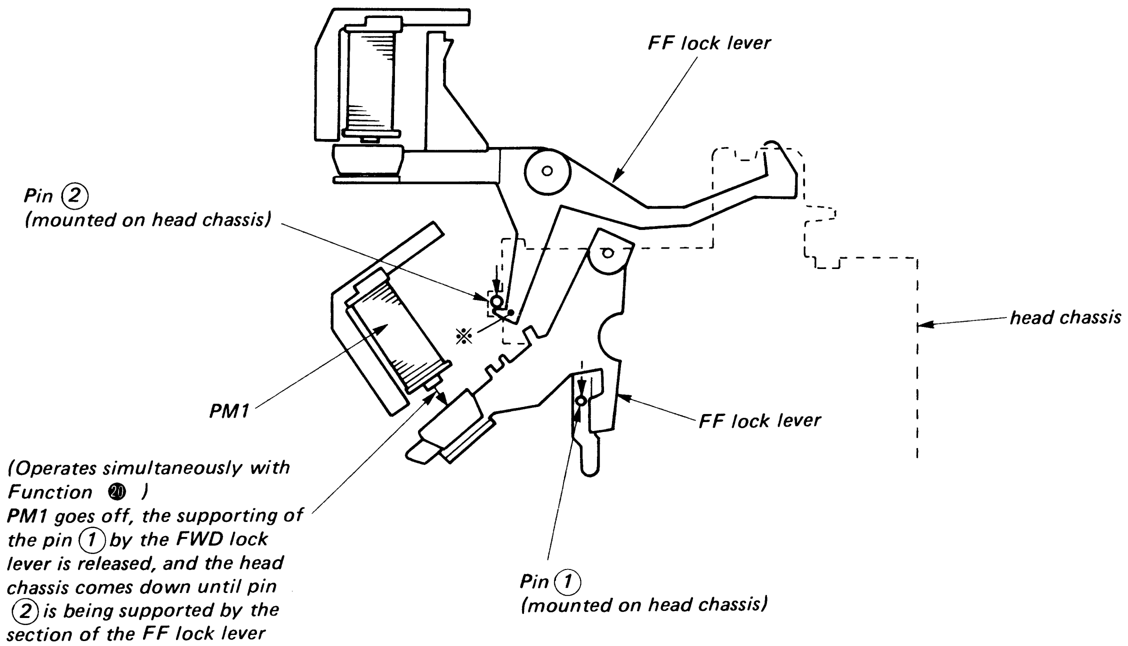

PM2
FF lever
FR pulley
Spring
Pawl
FR gear
Pause slider
FF lock lever
Take-up reel spindle

⑳ *The FF lock lever is pulled in the direction indicated by the arrow by the tension of the spring attached to the pause slider by the shifting of the pause slider described in Function ⑮, and attracted by the magnetic force of PM2.*

㉑ *Pawl is lowered*

㉒ *(▶+ ▶▶)*
The pawl comes down to shift the FR gear in the direction of the arrow by the friction generated when the FR pulley is turning, to turn the take-up reel table.

FWD AMS OPERATION (9)


FF lock lever
Pin ②
(mounted on head chassis)
※
head chassis
PM1
FF lock lever
Pin ①
(mounted on head chassis)

(Operates simultaneously with Function ⑳)
PM1 goes off, the supporting of the pin ① by the FWD lock lever is released, and the head chassis comes down until pin ② is being supported by the section of the FF lock lever indicated by an asterik (※).

2-8. REV

STOP

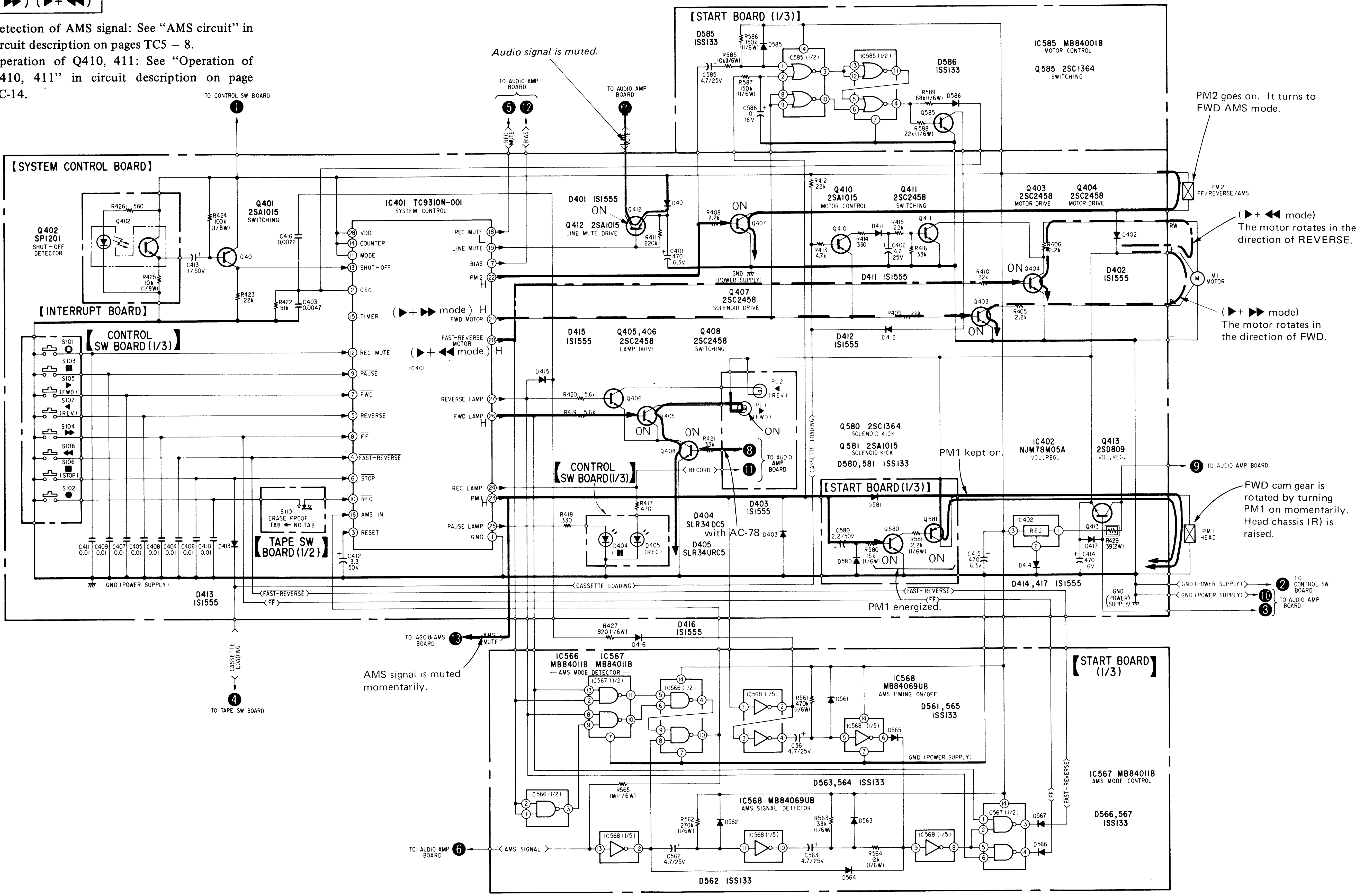
(AMS

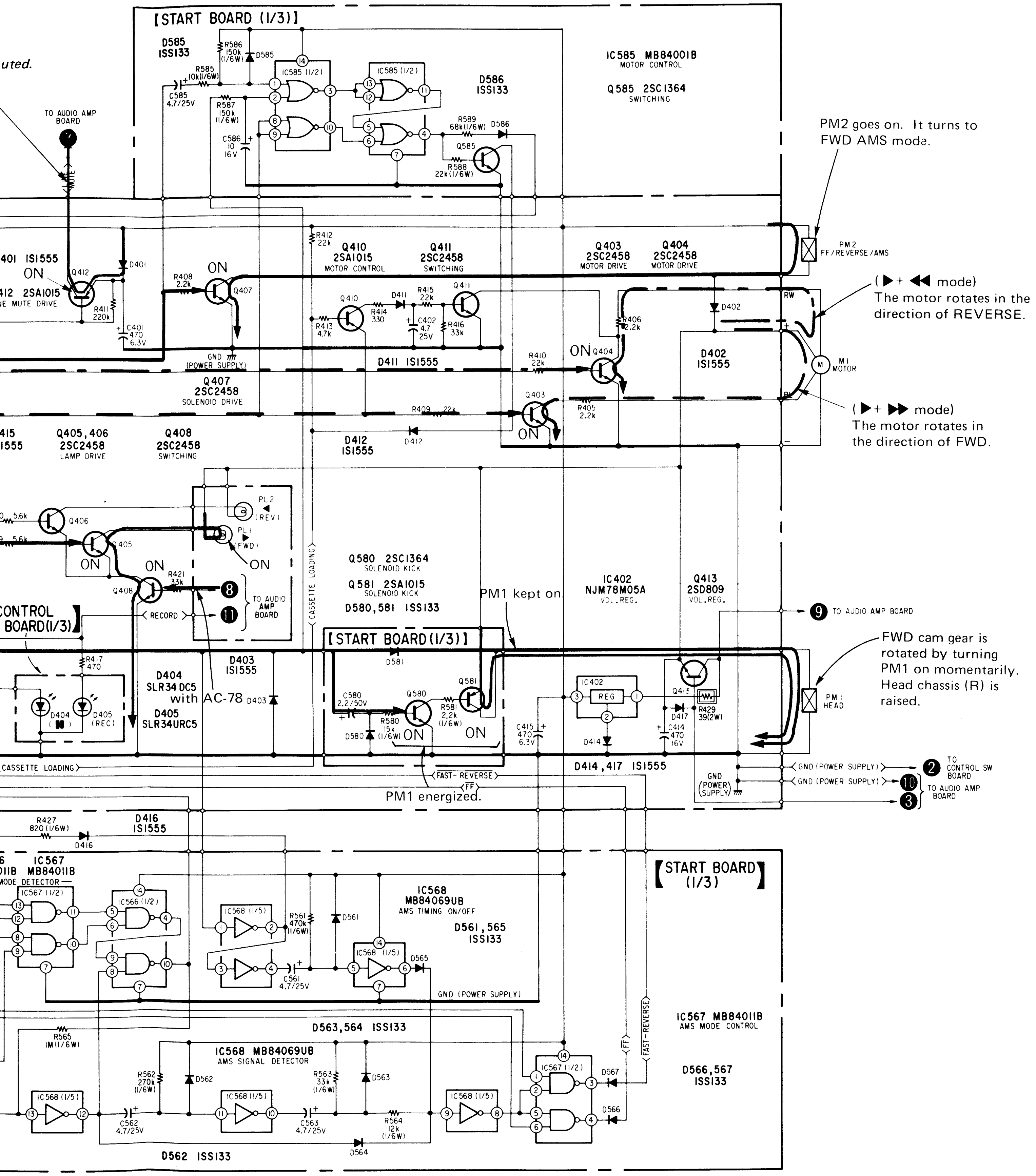
STOP

- **SIGNAL PATH**

FWD AMS MODE
(▶+▶▶) (▶+◀◀)

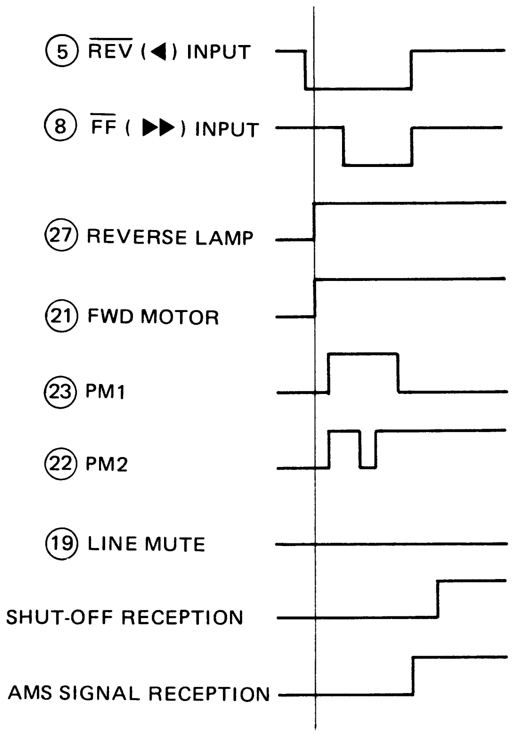
- Detection of AMS signal: See "AMS circuit" in circuit description on pages TC5 – 8.
- Operation of Q410, 411: See "Operation of Q410, 411" in circuit description on page TC-14.


TO CONTROL SW BOARD ❶
TO AUDIO AMP BOARD ❺ ⓬
Audio signal is muted.
TO AUDIO AMP BOARD ⓬
[START BOARD (1/3)]
D585 ISS133
IC585 MB84001B MOTOR CONTROL
Q585 2SC1364 SWITCHING
D586 ISS133
PM2 goes on. It turns to FWD AMS mode.
PM2 FF/REVERSE/AMS
[SYSTEM CONTROL BOARD]
Q402 SPI201 SHUT-OFF DETECTOR
Q401 2SA1015 SWITCHING
IC401 TC9310N-001 SYSTEM CONTROL
D401 ISS555
Q412 2SA1015 LINE MUTE DRIVE
ON
Q410 2SA1015 MOTOR CONTROL
Q411 2SC2458 SWITCHING
Q403 2SC2458 MOTOR DRIVE
Q404 2SC2458 MOTOR DRIVE
(▶+◀◀ mode) The motor rotates in the direction of REVERSE.
D402 ISS555
M1 MOTOR
(▶+▶▶ mode) The motor rotates in the direction of FWD.
Q407 2SC2458 SOLENOID DRIVE
D411 ISS555
D412 ISS555
[INTERRUPT BOARD]
[CONTROL SW BOARD (1/3)]
S101 S103 S105 (FWD) S107 (REV) S104 S108 S106 (STOP) S102
REC MUTE LINE MUTE BIAS PM 2 FWD MOTOR FAST-REVERSE MOTOR
(▶+▶▶ mode) H
(▶+◀◀ mode) H
VDD COUNTER MODE SHUT-OFF OSC TIMER REC MUTE PAUSE FWD REVERSE FF FAST-REVERSE STOP REC AMS IN RESET
REVERSE LAMP FWD LAMP REC LAMP PM1 PAUSE LAMP GND
D415 ISS555
Q405,406 2SC2458 LAMP DRIVE
Q408 2SC2458 SWITCHING
PL2 (REV) PL1 (FWD)
TO AUDIO AMP BOARD ❽ ⓫
[CONTROL SW BOARD (1/3)]
S110 ERASE PROOF TAB ← NO TAB
[TAPE SW BOARD (1/2)]
D404 SLR34DC5 with AC-78
D405 SLR34URC5
D403 ISS555
Q580 2SC1364 SOLENOID KICK
Q581 2SA1015 SOLENOID KICK
D580,581 ISS133
PM1 kept on.
[START BOARD (1/3)]
IC402 NJM78M05A VOL. REG.
Q413 2SD809 VOL. REG.
TO AUDIO AMP BOARD ❾
FWD cam gear is rotated by turning PM1 on momentarily. Head chassis (R) is raised.
PM1 HEAD
D414,417 ISS555
GND (POWER SUPPLY) TO CONTROL SW BOARD ❷
GND (POWER SUPPLY) TO AUDIO AMP BOARD ❿ ❸
PM1 energized.
D413 ISS555
GND (POWER SUPPLY)
CASSETTE LOADING
TO TAPE SW BOARD ❹
D416 ISS555
TO AGC & AMS BOARD ⓭ AMS MUTE
AMS signal is muted momentarily.
IC566 IC567 MB84011B MB84011B —AMS MODE DETECTOR—
IC568 MB84069UB AMS TIMING ON/OFF
D561,565 ISS133
[START BOARD (1/3)]
D563,564 ISS133
IC567 MB84011B AMS MODE CONTROL
IC568 MB84069UB AMS SIGNAL DETECTOR
D566,567 ISS133
TO AUDIO AMP BOARD ❻ AMS SIGNAL
D562 ISS133

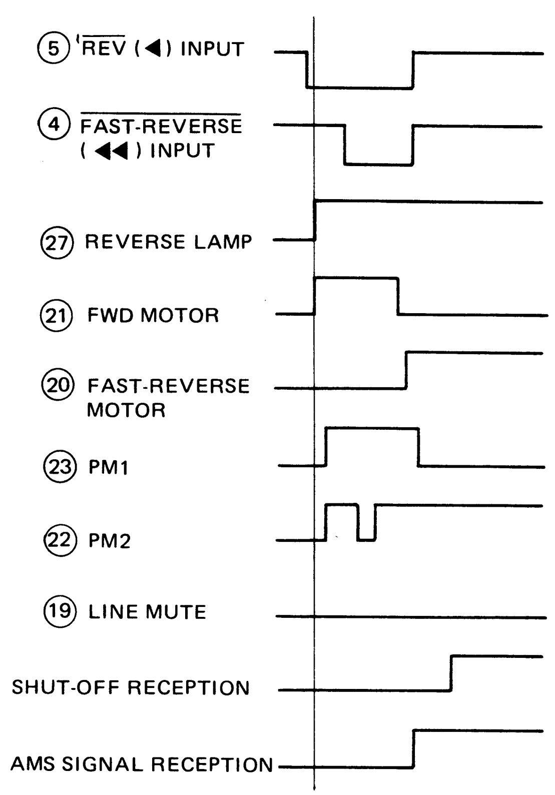

uted.
[START BOARD (1/3)]
D585 ISS133
IC585 MB84001B MOTOR CONTROL
Q585 2SC1364 SWITCHING
D586 ISS133
TO AUDIO AMP BOARD
MUTE
PM2 goes on. It turns to FWD AMS mode.
PM2 FF/REVERSE/AMS
401 IS1555
ON
412 2SA1015
E MUTE DRIVE
Q410 2SA1015 MOTOR CONTROL
Q411 2SC2458 SWITCHING
Q403 2SC2458 MOTOR DRIVE
Q404 2SC2458 MOTOR DRIVE
(▶+ ◀◀ mode)
The motor rotates in the direction of REVERSE.
M1 MOTOR
(▶+ ▶▶ mode)
The motor rotates in the direction of FWD.
GND (POWER SUPPLY)
Q407 2SC2458 SOLENOID DRIVE
D411 IS1555
D402 IS1555
D412 IS1555
415 1555
Q405,406 2SC2458 LAMP DRIVE
Q408 2SC2458 SWITCHING
PL2 ◀ (REV)
PL1 ▶ (FWD)
RECORD
TO AUDIO AMP BOARD
CASSETTE LOADING
Q580 2SC1364 SOLENOID KICK
Q581 2SA1015 SOLENOID KICK
D580,581 ISS133
PM1 kept on.
IC402 NJM78M05A VOL.REG.
Q413 2SD809 VOL.REG.
TO AUDIO AMP BOARD
CONTROL BOARD (1/3)
D404 SLR34DC5
with AC-78
D405 SLR34URC5
D403 IS1555
[START BOARD (1/3)]
FWD cam gear is rotated by turning PM1 on momentarily. Head chassis (R) is raised.
PM1 HEAD
D414,417 IS1555
FAST-REVERSE
FF
PM1 energized.
GND (POWER SUPPLY)
TO CONTROL SW BOARD
TO AUDIO AMP BOARD
D416 IS1555
IC567 MB84011B
MODE DETECTOR
IC568 MB84069UB AMS TIMING ON/OFF
D561,565 ISS133
[START BOARD (1/3)]
IC567 MB84011B AMS MODE CONTROL
D563,564 ISS133
IC568 MB84069UB AMS SIGNAL DETECTOR
D566,567 ISS133
D562 ISS133

2-8. REV AMS MODE

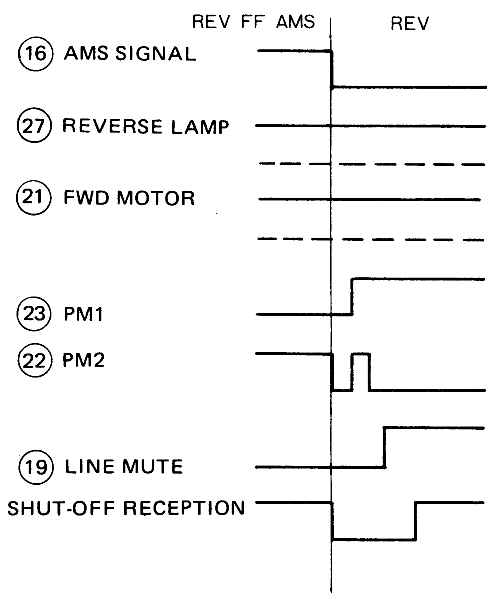
STOP ──▶ REV FF AMS
(AMS KEY INPUT OPERATION FROM STOP MODE)



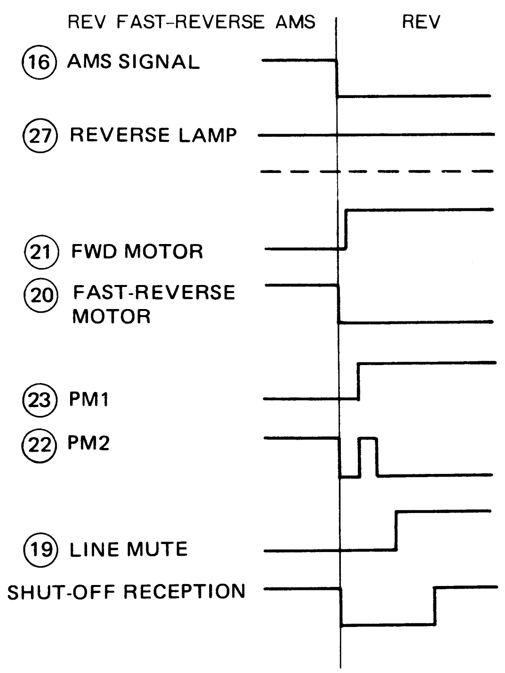
STOP ──▶ REV FAST-REVERSE AMS
(AMS KEY INPUT OPERATION FROM STOP MODE)



REV FF AMS SIGNAL RECEPTION



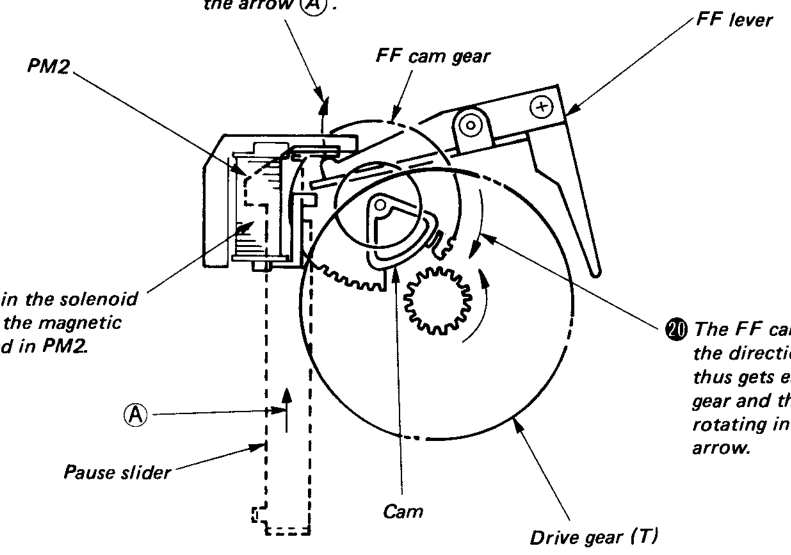
REV FAST-REVERSE SIGNAL RECEPTION



- **MECHANICAL OPERATION**

Operation of ❶ – ⓲ : See "Operation of REV mode" on page TC31 – 34.

REVERSE AMS OPERATION (7)

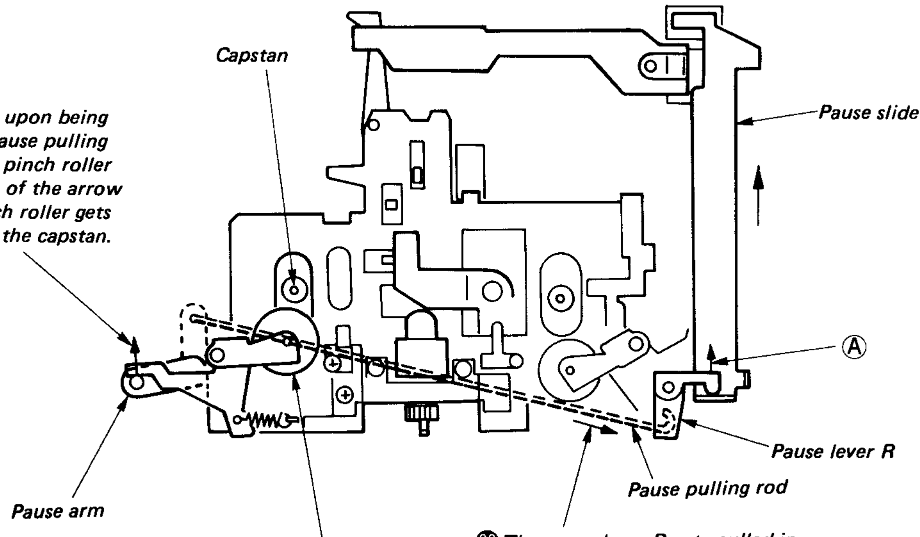

PM2
FF cam gear
FF lever
Ⓐ
Pause slider
Cam
Drive gear (T)

㉑ The FF lever gets pushed by the cam of the FF cam gear in the direction of the arrow and the pause slider gets pushed up in the direction of the arrow Ⓐ.

⑲ A current flows in the solenoid coil of PM2 and the magnetic force is generated in PM2.

⑳ The FF cam gear gets thrown in the direction of the arrow and thus gets engaged with the drive gear and the FF cam gear starts rotating in the direction of the arrow.

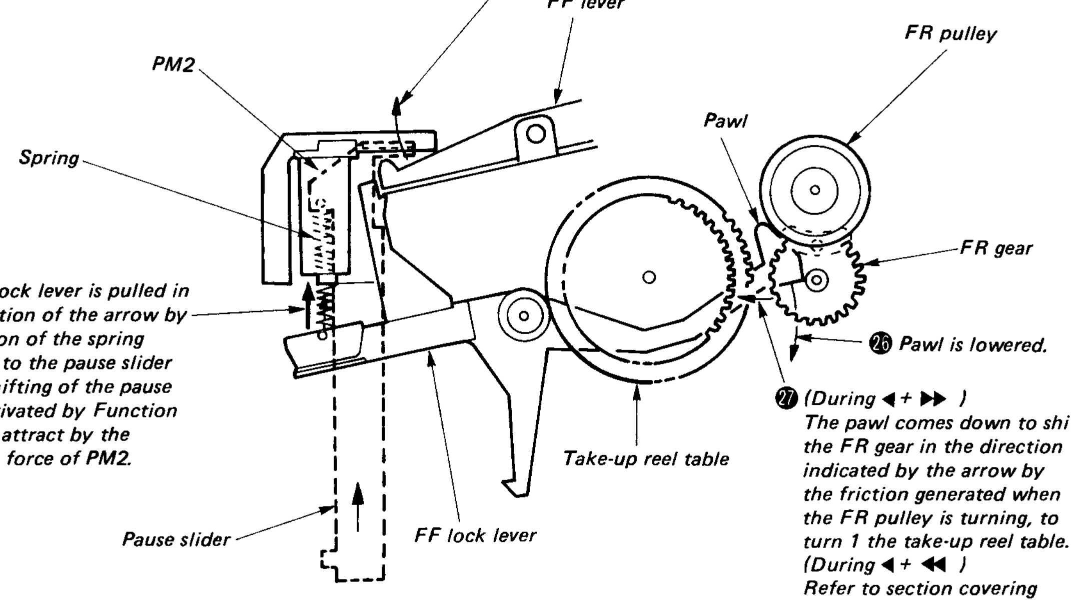
REVERSE AMS OPERATION (8)


Capstan
Pause slider
Ⓐ
Pause lever R
Pause pulling rod
Pause arm
Pinch roller (R)

㉓ The pause arm, upon being pulled by the pause pulling rod, pushes the pinch roller in the direction of the arrow so that the pinch roller gets separated from the capstan.

㉒ The pause lever R gets pulled in the direction of the arrow Ⓐ by the pause slider which in turn pulls the pause pulling rod in the direction of the arrow.

REVERSE AMS OPERATION (9)


FF lever
FR pulley
PM2
Pawl
Spring
FR gear
Take-up reel table
Pause slider
FF lock lever

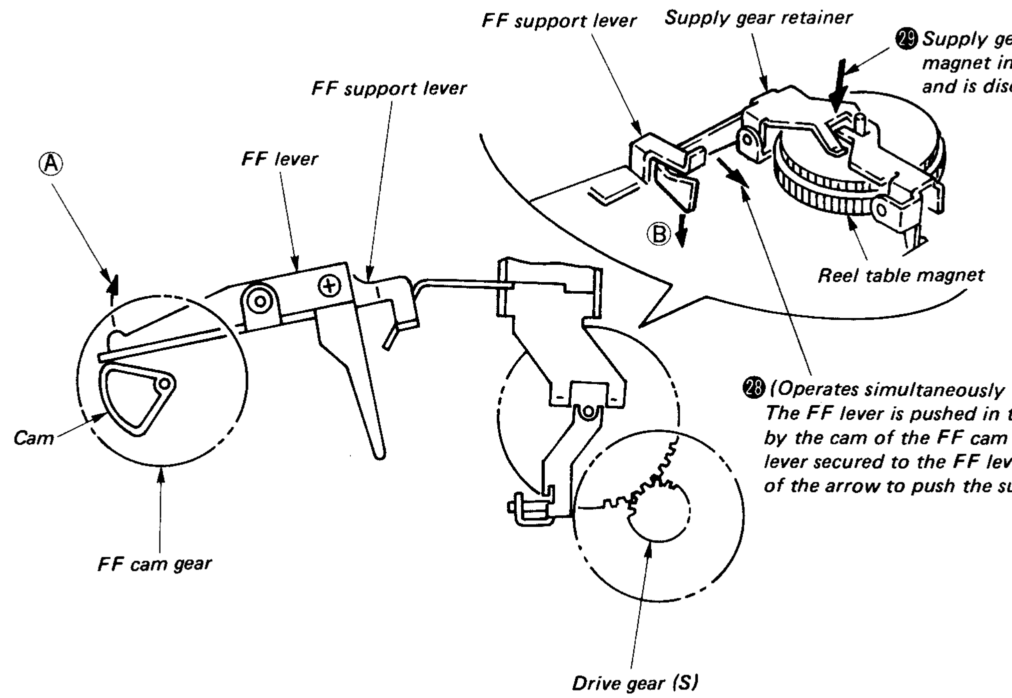
㉔ (Functions simultaneously with Function ㉑) The FF lock lever is released by the turning of the FF alever in the direction indicated by the arrow.

㉕ The FF lock lever is pulled in the direction of the arrow by the tension of the spring attached to the pause slider by the shifting of the pause slider activated by Function ㉑ , to attract by the magnetic force of PM2.

㉖ Pawl is lowered.

㉗ (During ◀ + ▶▶) The pawl comes down to shift the FR gear in the direction indicated by the arrow by the friction generated when the FR pulley is turning, to turn 1 the take-up reel table. (During ◀ + ◀◀) Refer to section covering FAST-REVERSE mode (See page TC-16).

REVERSE AMS OPERATION (10)


FF support lever
Supply gear retainer
FF support lever
Ⓐ
FF lever
Ⓑ
Reel table magnet
Cam
FF cam gear
Drive gear (S)

㉙ Supply gear retainer pushs reel table magnet in the direction of arrow and is disengaged with drive gear (S).

㉘ (Operates simultaneously with Function ㉑) The FF lever is pushed in the direction of arrow Ⓐ by the cam of the FF cam gear, and the FF support lever secured to the FF lever shifts in the direction of the arrow to push the supply gear retainer.

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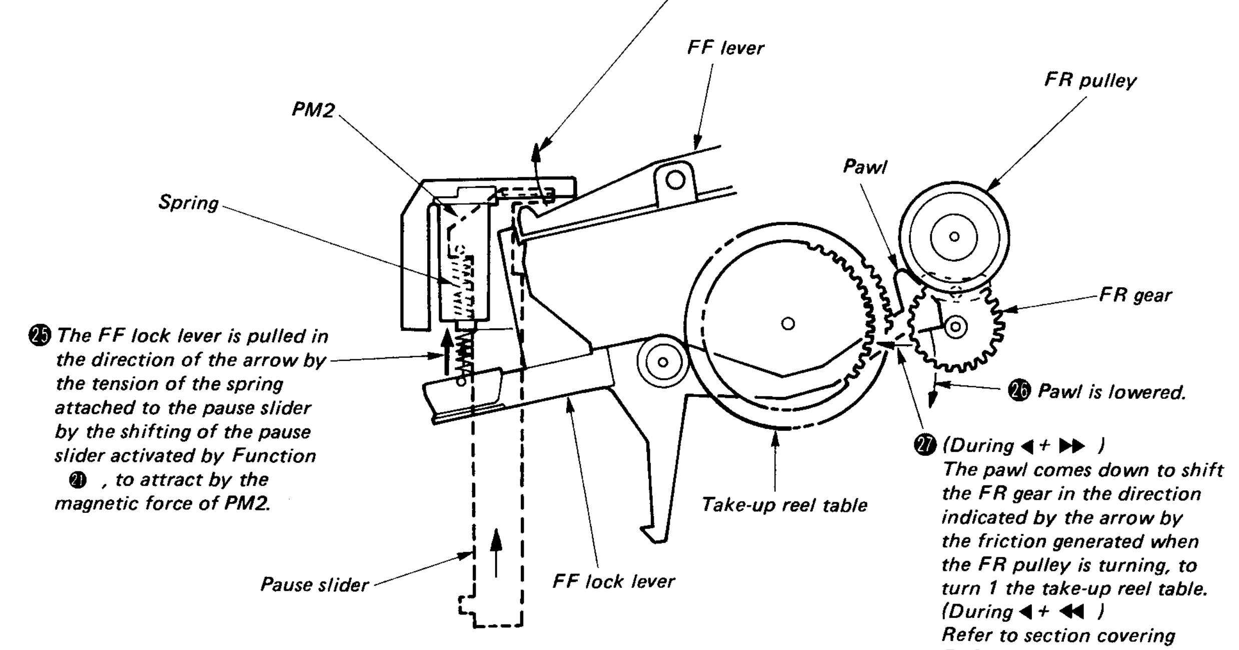
REVERSE AMS OPERATION (9)


FF lever
FR pulley
PM2
Pawl
Spring
FR gear
Take-up reel table
Pause slider
FF lock lever

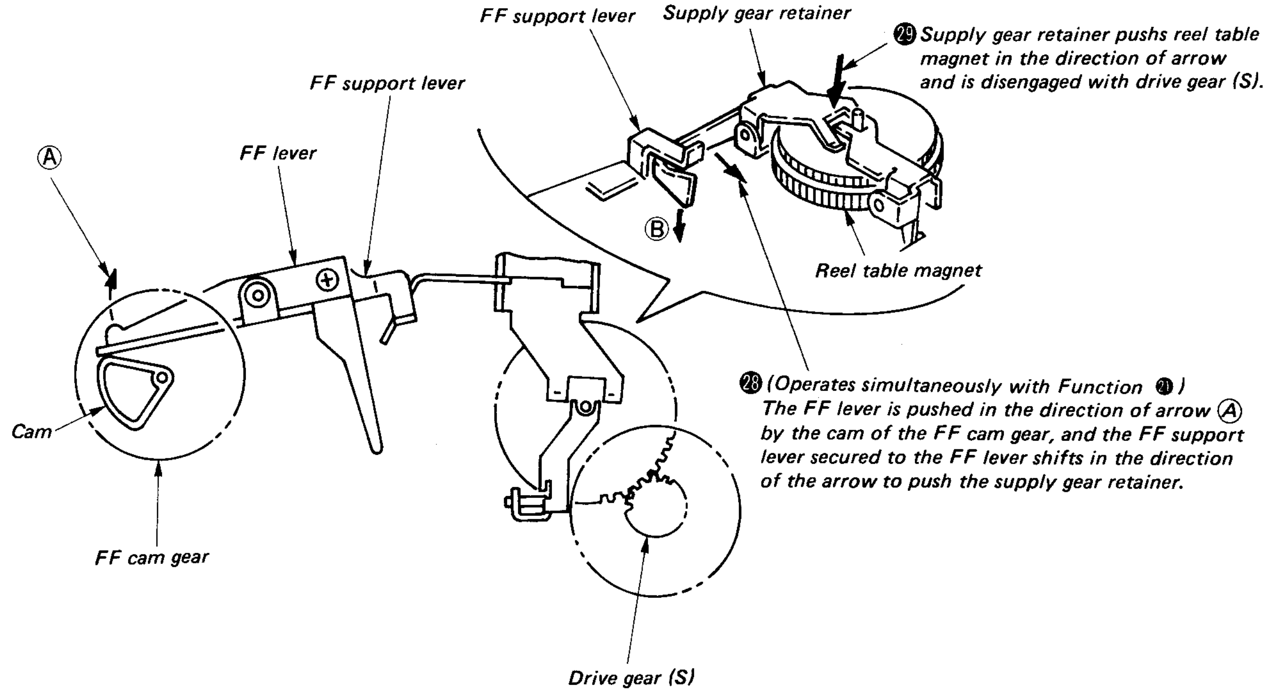
㉔ (Functions simultaneously with Function ㉑) The FF lock lever is released by the turning of the FF alever in the direction indicated by the arrow.

㉕ The FF lock lever is pulled in the direction of the arrow by the tension of the spring attached to the pause slider by the shifting of the pause slider activated by Function ㉑ , to attract by the magnetic force of PM2.

㉖ Pawl is lowered.

㉗ (During ◀ + ▶▶) The pawl comes down to shift the FR gear in the direction indicated by the arrow by the friction generated when the FR pulley is turning, to turn 1 the take-up reel table. (During ◀ + ◀◀) Refer to section covering FAST-REVERSE mode (See page TC-16).

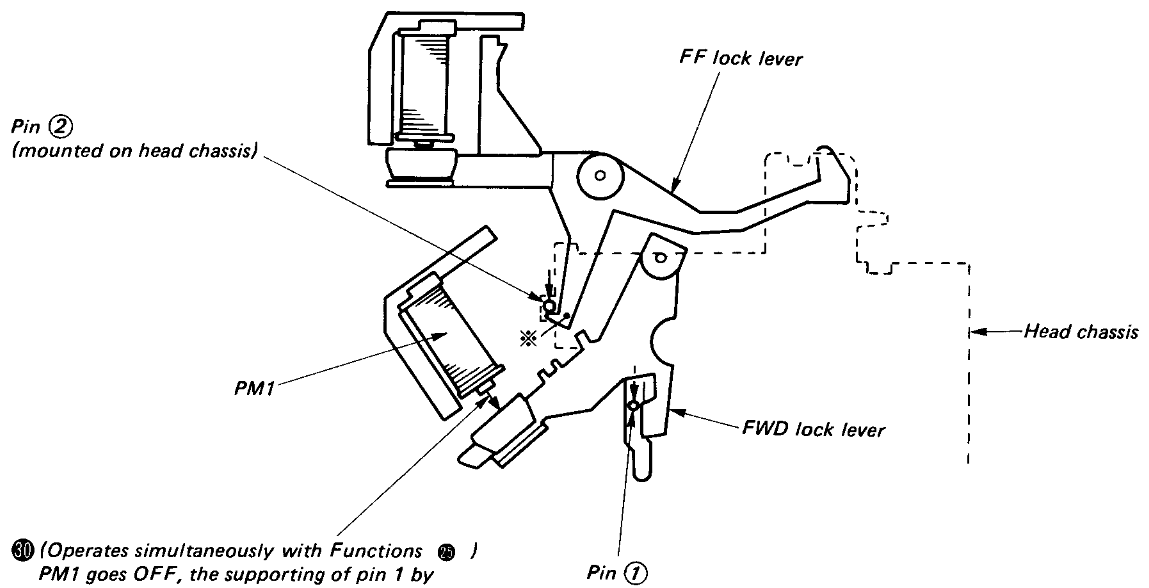
REVERSE AMS OPERATION (10)


FF support lever
Supply gear retainer
FF support lever
Ⓐ
FF lever
Ⓑ
Reel table magnet
Cam
FF cam gear
Drive gear (S)

㉙ Supply gear retainer pushes reel table magnet in the direction of arrow and is disengaged with drive gear (S).

㉘ (Operates simultaneously with Function ㉑) The FF lever is pushed in the direction of arrow Ⓐ by the cam of the FF cam gear, and the FF support lever secured to the FF lever shifts in the direction of the arrow to push the supply gear retainer.

REVERSE AMS OPERATION (11)

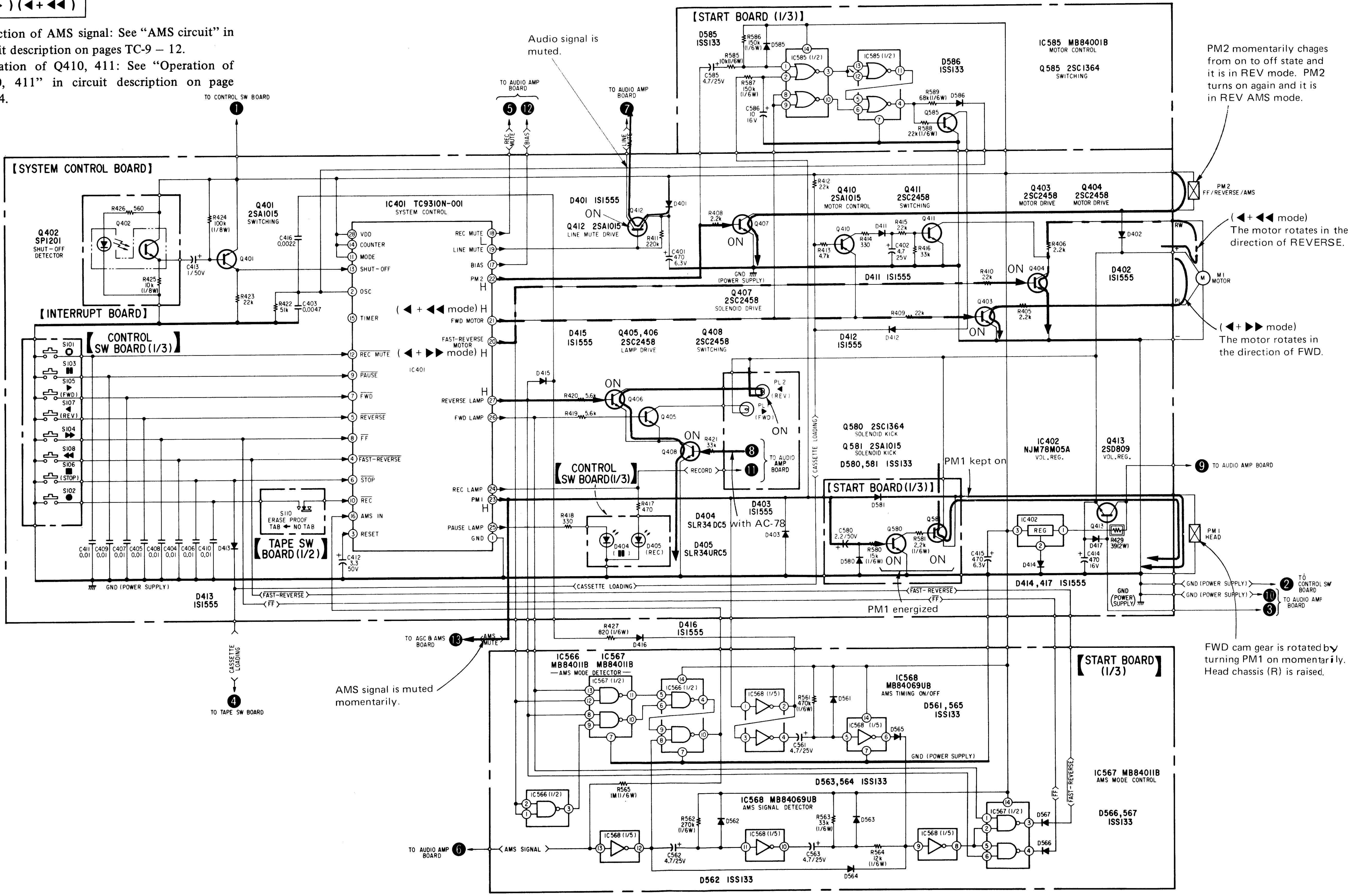

FF lock lever
Pin ②
(mounted on head chassis)
Head chassis
※
PM1
FWD lock lever
Pin ①
(mounted on head chassis)

㉚ (Operates simultaneously with Functions ㉙) PM1 goes OFF, the supporting of pin 1 by the lock lever is released, and the head chassis moves down until pin ② of the head chassis is supported by the section of the FWD lock lever indicated by the asterik (※).

• SIGNAL PATH

REV AMS MODE
(◀+▶▶) (◀+◀◀)

- Detection of AMS signal: See "AMS circuit" in circuit description on pages TC-9 – 12.
- Operation of Q410, 411: See "Operation of Q410, 411" in circuit description on page TC-14.


[START BOARD (1/3)]
[SYSTEM CONTROL BOARD]
[INTERRUPT BOARD]
CONTROL SW BOARD (1/3)
TAPE SW BOARD (1/2)
TO CONTROL SW BOARD ❶
TO AUDIO AMP BOARD ❺ ⓬
TO AUDIO AMP BOARD ❼
TO AUDIO AMP BOARD ❾
TO CONTROL SW BOARD ❷
TO AUDIO AMP BOARD ❿ ❸
TO AGC & AMS BOARD ⓭
TO TAPE SW BOARD ❹
TO AUDIO AMP BOARD ❻
REC MUTE
BIAS
LINE MUTE
Q402 SP1201 SHUT-OFF DETECTOR
Q401 2SA1015 SWITCHING
IC401 TC9310N-001 SYSTEM CONTROL
VDD
COUNTER
MODE
SHUT-OFF
OSC
TIMER
REC MUTE
PAUSE
FWD
REVERSE
FF
FAST-REVERSE
STOP
REC
AMS IN
RESET
REC MUTE
LINE MUTE
BIAS
PM2
FWD MOTOR
FAST-REVERSE MOTOR
REVERSE LAMP
FWD LAMP
REC LAMP
PM1
PAUSE LAMP
GND
(◀+◀◀ mode) H
(◀+▶▶ mode) H
S101 S103 S105 (FWD) S107 (REV) S104 S108 S106 (STOP) S102
S110 ERASE PROOF TAB ← NO TAB
D401 1S1555
Q412 2SA1015 LINE MUTE DRIVE
ON
GND (POWER SUPPLY)
Q407 2SC2458 SOLENOID DRIVE
Q410 2SA1015 MOTOR CONTROL
Q411 2SC2458 SWITCHING
D411 1S1555
Q403 2SC2458 MOTOR DRIVE
Q404 2SC2458 MOTOR DRIVE
D402 1S1555
D412 1S1555
PM2 FF/REVERSE/AMS
M1 MOTOR
D415 1S1555
Q405,406 2SC2458 LAMP DRIVE
Q408 2SC2458 SWITCHING
PL2 (REV)
PL1 (FWD)
RECORD
D404 SLR34DC5
D405 SLR34URC5
D403 1S1555
with AC-78
Q580 2SC1364 SOLENOID KICK
Q581 2SA1015 SOLENOID KICK
D580,581 1SS133
IC402 NJM78M05A VOL.REG.
Q413 2SD809 VOL.REG.
D414,417 1S1555
PM1 HEAD
D413 1S1555
CASSETTE LOADING
FAST-REVERSE
FF
D416 1S1555
IC585 MB84001B MOTOR CONTROL
Q585 2SC1364 SWITCHING
D585 1SS133
D586 1SS133
IC566 IC567 MB84011B MB84011B — AMS MODE DETECTOR —
IC568 MB84069UB AMS TIMING ON/OFF
D561,565 1SS133
D563,564 1SS133
IC568 MB84069UB AMS SIGNAL DETECTOR
D562 1SS133
IC567 MB84011B AMS MODE CONTROL
D566,567 1SS133
AMS SIGNAL
AMS MUTE

Audio signal is muted.

PM2 momentarily chages from on to off state and it is in REV mode. PM2 turns on again and it is in REV AMS mode.

(◀+◀◀ mode) The motor rotates in the direction of REVERSE.

(◀+▶▶ mode) The motor rotates in the direction of FWD.

PM1 kept on

PM1 energized

FWD cam gear is rotated by turning PM1 on momentarily. Head chassis (R) is raised.

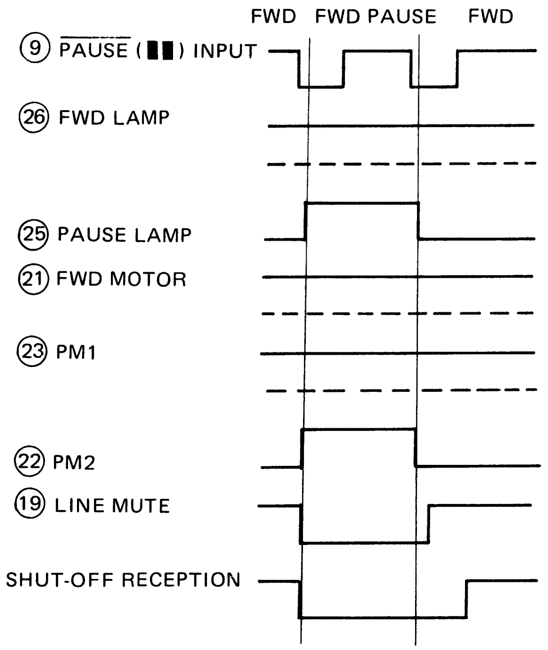
AMS signal is muted momentarily.

2-9. FWD PAUSE MODE

(When pushing pause switch at FWD mode)

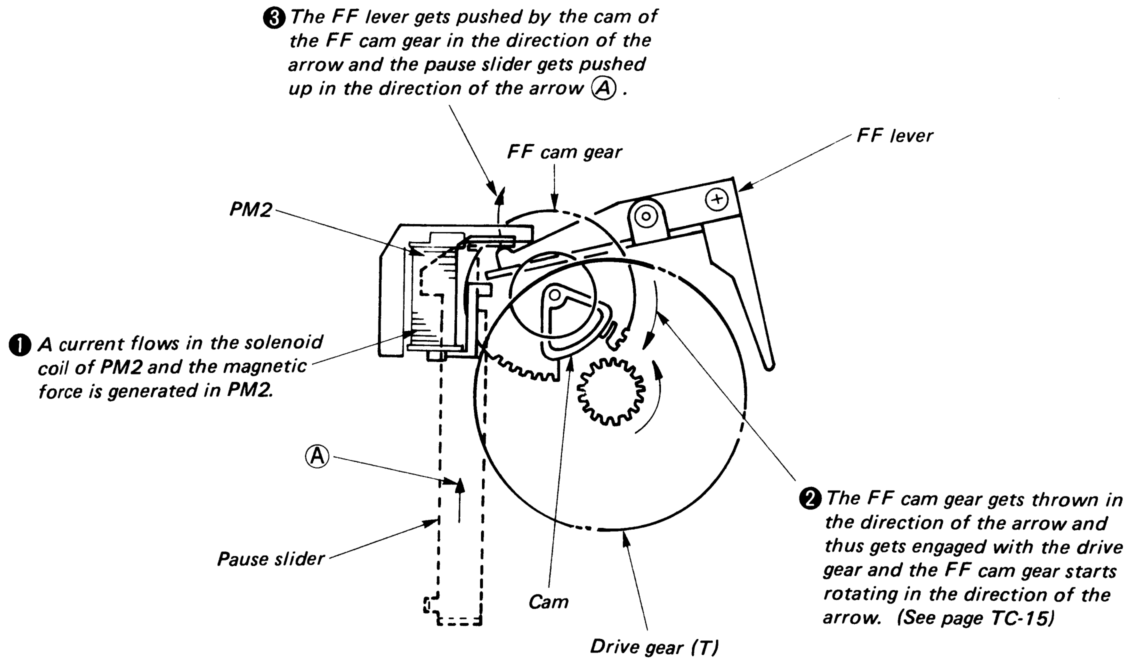
- **TIMING OF IC401**

FWD ←→ FWD PAUSE



- **MECHANISM OPERATION**

FWD PAUSE OPERATION (1)

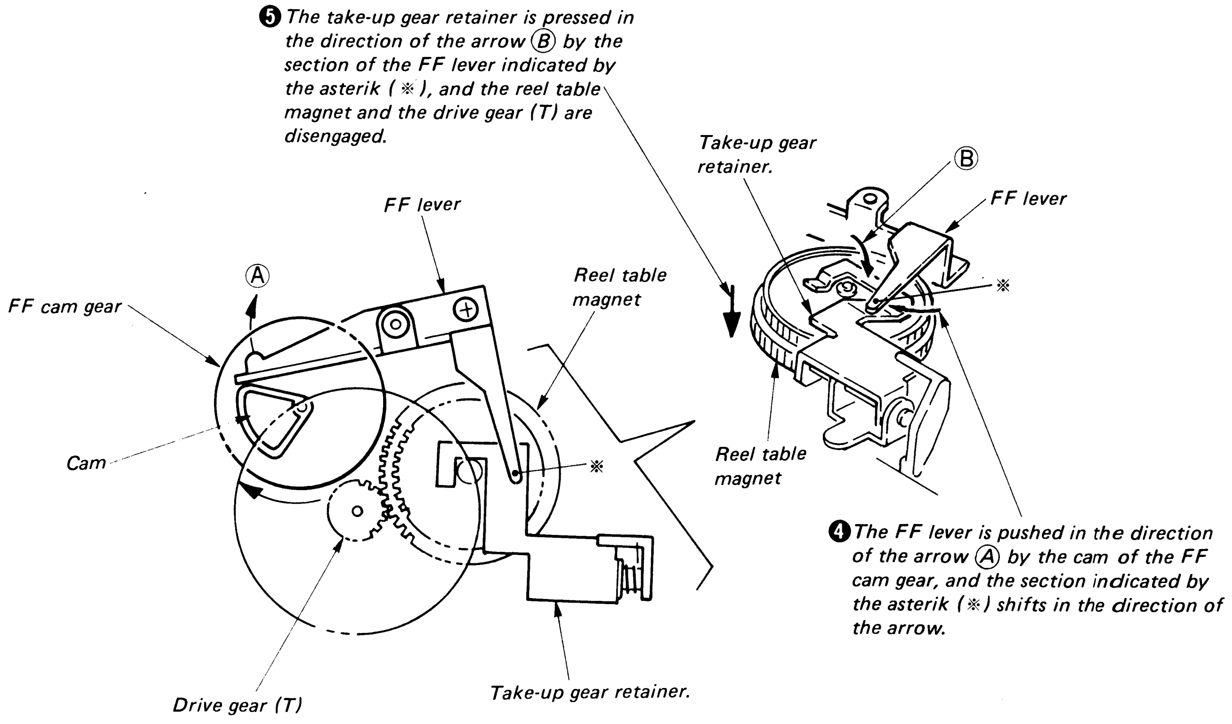

FF cam gear
FF lever
PM2
Ⓐ
Pause slider
Cam
Drive gear (T)

❶ *A current flows in the solenoid coil of PM2 and the magnetic force is generated in PM2.*

❷ *The FF cam gear gets thrown in the direction of the arrow and thus gets engaged with the drive gear and the FF cam gear starts rotating in the direction of the arrow. (See page TC-15)*

❸ *The FF lever gets pushed by the cam of the FF cam gear in the direction of the arrow and the pause slider gets pushed up in the direction of the arrow Ⓐ.*

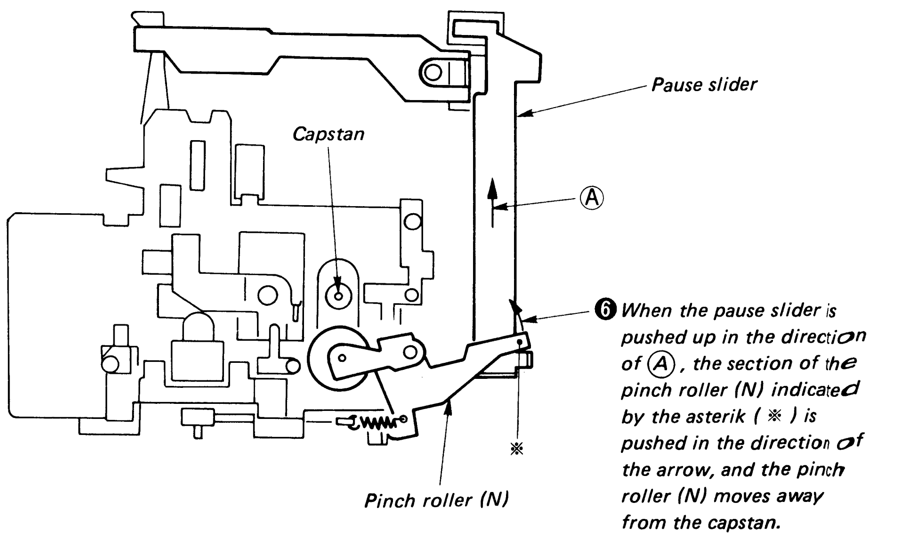
FWD PAUSE OPERATION (2)


FF lever
Ⓐ
FF cam gear
Reel table magnet
Cam
※
Drive gear (T)
Take-up gear retainer.
Take-up gear retainer.
Ⓑ
FF lever
※
Reel table magnet

❹ *The FF lever is pushed in the direction of the arrow Ⓐ by the cam of the FF cam gear, and the section indicated by the asterik (※) shifts in the direction of the arrow.*

❺ *The take-up gear retainer is pressed in the direction of the arrow Ⓑ by the section of the FF lever indicated by the asterik (※), and the reel table magnet and the drive gear (T) are disengaged.*

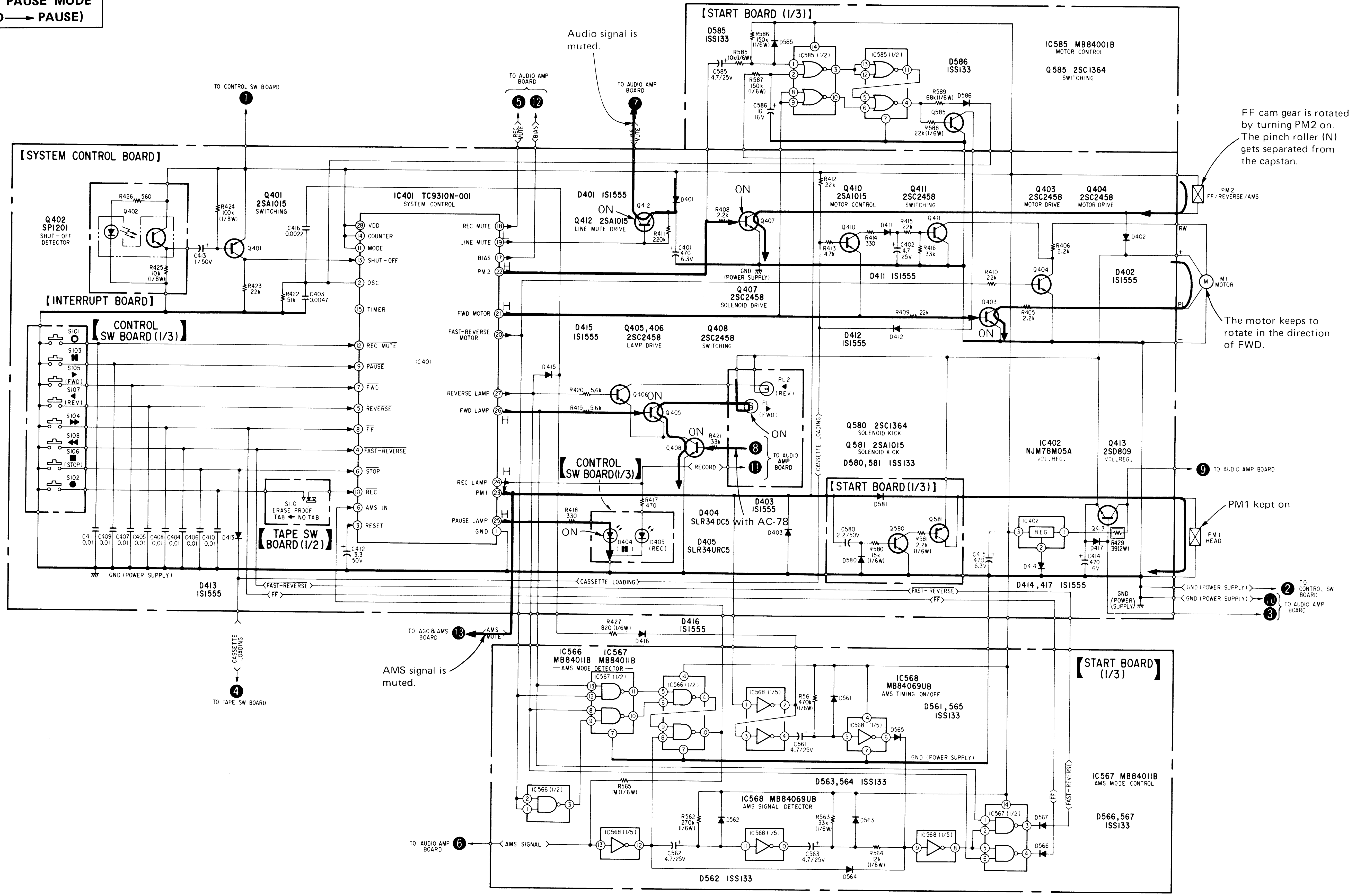
FWD PAUSE OPERATION (3)


Pause slider
Capstan
Ⓐ
※
Pinch roller (N)

❻ *When the pause slider is pushed up in the direction of Ⓐ, the section of the pinch roller (N) indicated by the asterik (※) is pushed in the direction of the arrow, and the pinch roller (N) moves away from the capstan.*

• SIGNAL PATH

FWD PAUSE MODE (FWD → PAUSE)



Audio signal is muted.

FF cam gear is rotated by turning PM2 on. The pinch roller (N) gets separated from the capstan.

The motor keeps to rotate in the direction of FWD.

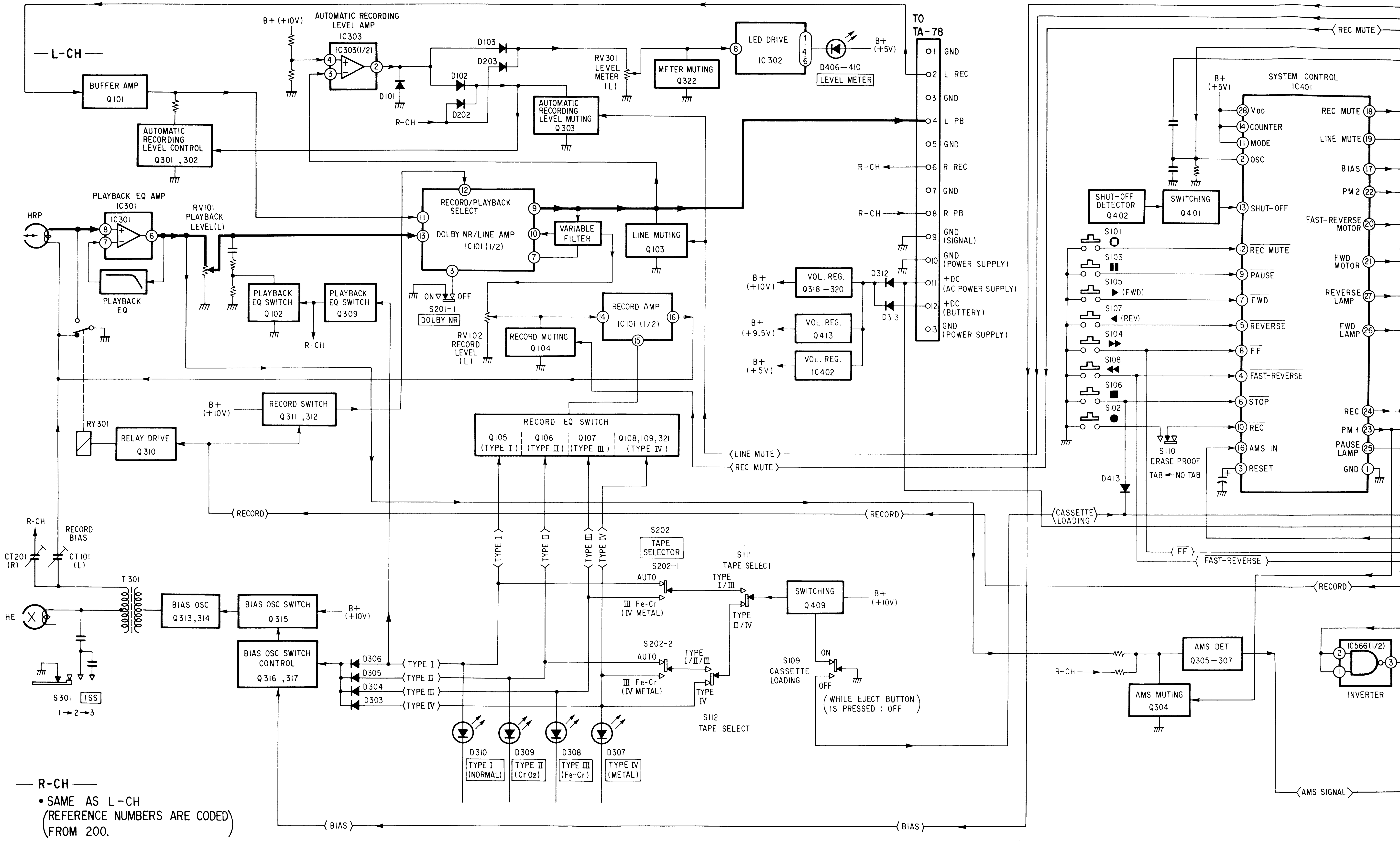
PM1 kept on

AMS signal is muted.

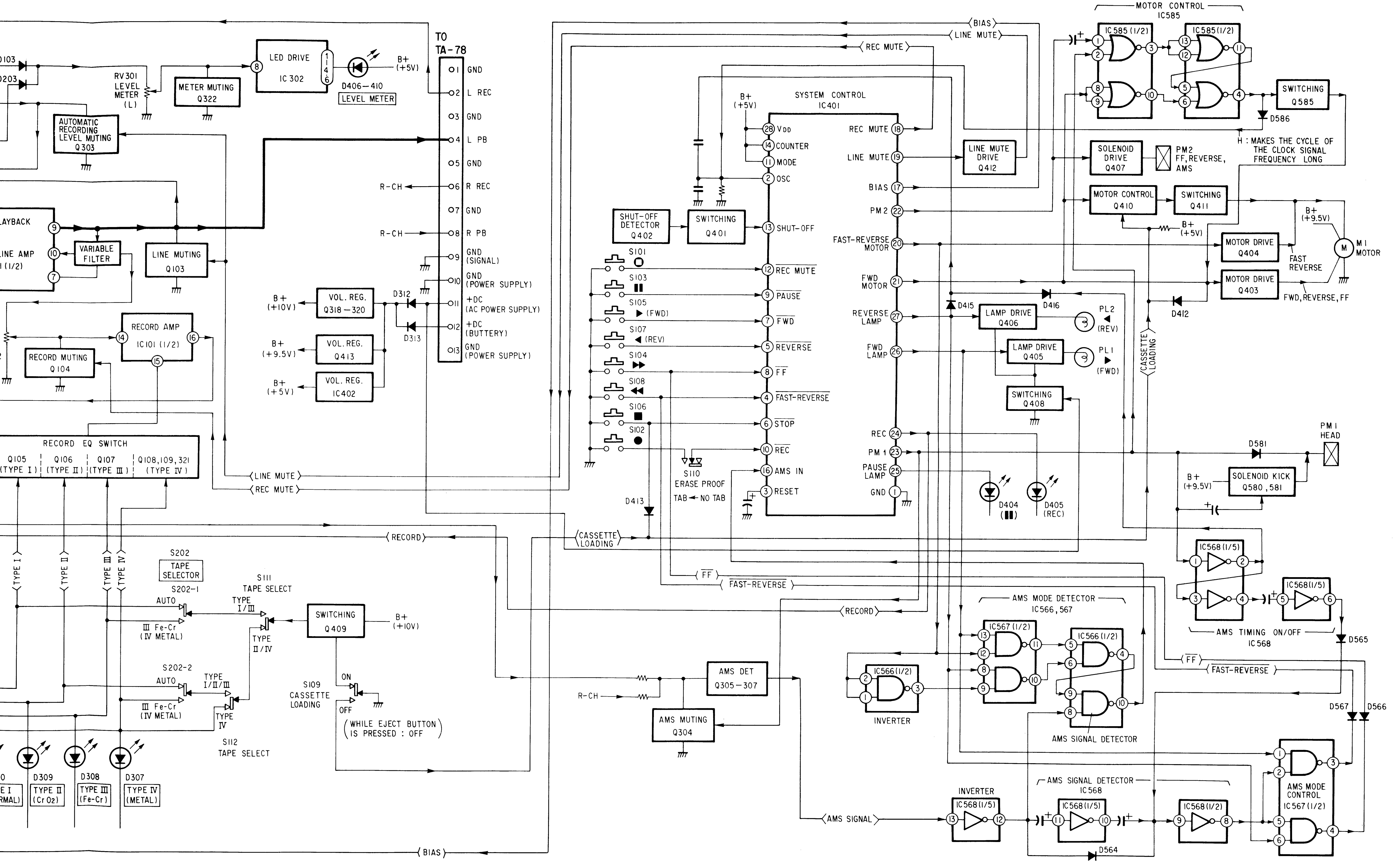
[SYSTEM CONTROL BOARD]
[INTERRUPT BOARD]
[CONTROL SW BOARD (1/3)]
[TAPE SW BOARD (1/2)]
[START BOARD (1/3)]
IC401 TC9310N-001 SYSTEM CONTROL
Q401 2SA1015 SWITCHING
Q402 SP1201 SHUT-OFF DETECTOR
D401 1S1555
Q412 2SA1015 LINE MUTE DRIVE
Q407 2SC2458 SOLENOID DRIVE
Q410 2SA1015 MOTOR CONTROL
Q411 2SC2458 SWITCHING
Q403 2SC2458 MOTOR DRIVE
Q404 2SC2458 MOTOR DRIVE
D402 1S1555
D411 1S1555
D412 1S1555
D415 1S1555
Q405,406 2SC2458 LAMP DRIVE
Q408 2SC2458 SWITCHING
D404 SLR34DC5
D405 SLR34URC5
D403 1S1555 with AC-78
Q580 2SC1364 SOLENOID KICK
Q581 2SA1015 SOLENOID KICK
D580,581 1SS133
IC402 NJM78M05A VOL. REG.
Q413 2SD809 VOL. REG.
D414,417 1S1555
D413 1S1555
D416 1S1555
D585 1SS133
D586 1SS133
IC585 MB84001B MOTOR CONTROL
Q585 2SC1364 SWITCHING
IC566 MB84011B
IC567 MB84011B
—AMS MODE DETECTOR—
IC568 MB84069UB AMS TIMING ON/OFF
D561,565 1SS133
D563,564 1SS133
IC568 MB84069UB AMS SIGNAL DETECTOR
IC567 MB84011B AMS MODE CONTROL
D566,567 1SS133
D562 1SS133
PM2 FF/REVERSE/AMS
M1 MOTOR
PM1 HEAD
PL1 (FWD)
PL2 (REV)
S101 S103 S105 (FWD) S107 (REV) S104 S108 S106 (STOP) S102
S110 ERASE PROOF TAB ← NO TAB
VDD COUNTER MODE SHUT-OFF OSC TIMER
REC MUTE LINE MUTE BIAS PM2 FWD MOTOR FAST-REVERSE MOTOR
REVERSE LAMP FWD LAMP REC LAMP PM1 PAUSE LAMP GND
REC MUTE PAUSE FWD REVERSE FF FAST-REVERSE STOP REC AMS IN RESET
ON
H
TO CONTROL SW BOARD ①
TO AUDIO AMP BOARD ⑤ ⑫
TO AUDIO AMP BOARD ⑦
TO AUDIO AMP BOARD ⑧ ⑪
TO AUDIO AMP BOARD ⑨
TO CONTROL SW BOARD ②
TO AUDIO AMP BOARD ⑩ ③
TO TAPE SW BOARD ④
TO AGC & AMS BOARD ⑬
TO AUDIO AMP BOARD ⑥
GND (POWER SUPPLY)
CASSETTE LOADING
FAST-REVERSE
FF
RECORD
AMS SIGNAL
AMS MUTE
REC MUTE
BIAS
LINE MUTE

SECTION 3
OUTLINE

3-1. BLOCK DIAGRAM


— L-CH —
BUFFER AMP Q101
AUTOMATIC RECORDING LEVEL CONTROL Q301, 302
B+ (+10V)
AUTOMATIC RECORDING LEVEL AMP IC303
IC303(1/2)
D101
D103
D203
D102
D202
R-CH
RV301 LEVEL METER (L)
AUTOMATIC RECORDING LEVEL MUTING Q303
METER MUTING Q322
LED DRIVE IC302
D406—410 LEVEL METER
B+ (+5V)
TO TA-78
1 GND
2 L REC
3 GND
4 L PB
5 GND
6 R REC
7 GND
8 R PB
9 GND (SIGNAL)
10 GND (POWER SUPPLY)
11 +DC (AC POWER SUPPLY)
12 +DC (BUTTERY)
13 GND (POWER SUPPLY)
HRP
PLAYBACK EQ AMP IC301
PLAYBACK EQ
RV101 PLAYBACK LEVEL(L)
PLAYBACK EQ SWITCH Q102
PLAYBACK EQ SWITCH Q309
RECORD/PLAYBACK SELECT
DOLBY NR/LINE AMP IC101 (1/2)
VARIABLE FILTER
LINE MUTING Q103
ON OFF
S201-1 DOLBY NR
RV102 RECORD LEVEL (L)
RECORD MUTING Q104
RECORD AMP IC101 (1/2)
VOL. REG. Q318—320
VOL. REG. Q413
VOL. REG. IC402
B+ (+10V)
B+ (+9.5V)
B+ (+5V)
D312
D313
RY301
RELAY DRIVE Q310
RECORD SWITCH Q311, 312
RECORD EQ SWITCH
Q105 (TYPE I)
Q106 (TYPE II)
Q107 (TYPE III)
Q108, 109, 321 (TYPE IV)
LINE MUTE
REC MUTE
RECORD
CASSETTE LOADING
R-CH
RECORD BIAS
CT201 (R)
CT101 (L)
T301
HE
BIAS OSC Q313, 314
BIAS OSC SWITCH Q315
BIAS OSC SWITCH CONTROL Q316, 317
S301 ISS
1→2→3
D306
D305
D304
D303
TYPE I
TYPE II
TYPE III
TYPE IV
D310 TYPE I (NORMAL)
D309 TYPE II (CrO2)
D308 TYPE III (Fe-Cr)
D307 TYPE IV (METAL)
S202 TAPE SELECTOR
S202-1
AUTO
III Fe-Cr (IV METAL)
S202-2
S111 TAPE SELECT
TYPE I/III
TYPE II/IV
TYPE I/II/III
TYPE IV
S112 TAPE SELECT
SWITCHING Q409
S109 CASSETTE LOADING
ON
OFF
(WHILE EJECT BUTTON IS PRESSED : OFF)
BIAS
SYSTEM CONTROL IC401
B+ (+5V)
28 VDD
14 COUNTER
11 MODE
2 OSC
13 SHUT-OFF
12 REC MUTE
9 PAUSE
7 FWD
5 REVERSE
8 FF
4 FAST-REVERSE
6 STOP
10 REC
16 AMS IN
3 RESET
REC MUTE 18
LINE MUTE 19
BIAS 17
PM2 22
FAST-REVERSE MOTOR 20
FWD MOTOR 21
REVERSE LAMP 27
FWD LAMP 26
REC 24
PM1 23
PAUSE LAMP 25
GND 1
SHUT-OFF DETECTOR Q402
SWITCHING Q401
S101
S103
S105 (FWD)
S107 (REV)
S104
S108
S106
S102
S110 ERASE PROOF
TAB ← NO TAB
D413
FF
FAST-REVERSE
AMS DET Q305—307
AMS MUTING Q304
IC566(1/2)
INVERTER
AMS SIGNAL

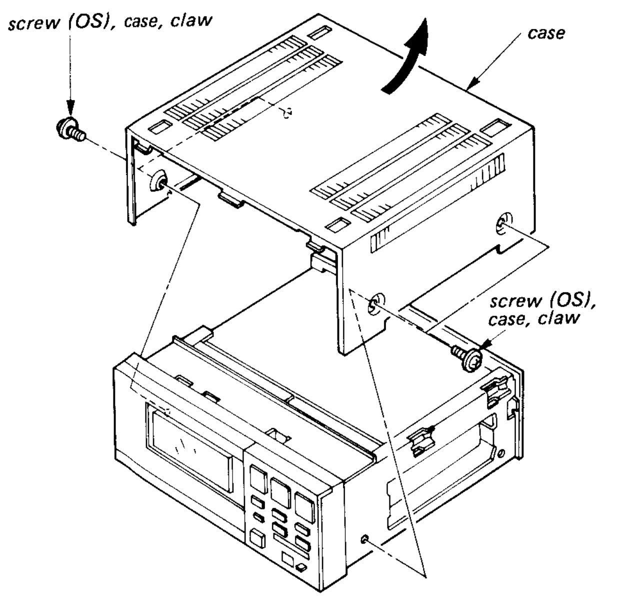
— R-CH —
- SAME AS L-CH
(REFERENCE NUMBERS ARE CODED FROM 200.)


TO TA-78
1 GND
2 L REC
3 GND
4 L PB
5 GND
6 R REC
7 GND
8 R PB
9 GND (SIGNAL)
10 GND (POWER SUPPLY)
11 +DC (AC POWER SUPPLY)
12 +DC (BUTTERY)
13 GND (POWER SUPPLY)
R-CH
LED DRIVE IC302
D406-410 LEVEL METER
B+ (+5V)
RV301 LEVEL METER (L)
METER MUTING Q322
AUTOMATIC RECORDING LEVEL MUTING Q303
LAYBACK
LINE AMP (1/2)
VARIABLE FILTER
LINE MUTING Q103
RECORD AMP IC101 (1/2)
RECORD MUTING Q104
RECORD EQ SWITCH
Q105 (TYPE I)
Q106 (TYPE II)
Q107 (TYPE III)
Q108,109,321 (TYPE IV)
VOL. REG. Q318-320
B+ (+10V)
VOL. REG. Q413
B+ (+9.5V)
VOL. REG. IC402
B+ (+5V)
D312
D313
LINE MUTE
REC MUTE
RECORD
BIAS
TYPE I
TYPE II
TYPE III
TYPE IV
S202 TAPE SELECTOR
S202-1
AUTO
III Fe-Cr (IV METAL)
S202-2
S111 TAPE SELECT
TYPE I/III
TYPE II/IV
TYPE I/II/III
TYPE IV
S112 TAPE SELECT
SWITCHING Q409
B+ (+10V)
S109 CASSETTE LOADING
ON
OFF
(WHILE EJECT BUTTON IS PRESSED : OFF)
D309 TYPE II (CrO2)
D308 TYPE III (Fe-Cr)
D307 TYPE IV (METAL)
TYPE I (NORMAL)
SYSTEM CONTROL IC401
B+ (+5V)
28 VDD
14 COUNTER
11 MODE
2 OSC
13 SHUT-OFF
12 REC MUTE
9 PAUSE
7 FWD
5 REVERSE
8 FF
4 FAST-REVERSE
6 STOP
10 REC
16 AMS IN
3 RESET
18 REC MUTE
19 LINE MUTE
17 BIAS
22 PM2
20 FAST-REVERSE MOTOR
21 FWD MOTOR
27 REVERSE LAMP
26 FWD LAMP
24 REC
23 PM1
25 PAUSE LAMP
1 GND
SHUT-OFF DETECTOR Q402
SWITCHING Q401
S101
S103
S105 ▶ (FWD)
S107 ◀ (REV)
S104 ▶▶
S108 ◀◀
S106 ■
S102 ●
S110 ERASE PROOF
TAB ← NO TAB
D413
CASSETTE LOADING
FF
FAST-REVERSE
AMS DET Q305-307
AMS MUTING Q304
R-CH
AMS SIGNAL
LINE MUTE DRIVE Q412
SOLENOID DRIVE Q407
PM2 FF, REVERSE, AMS
MOTOR CONTROL Q410
SWITCHING Q411
MOTOR CONTROL IC585
IC585 (1/2)
SWITCHING Q585
D586
H : MAKES THE CYCLE OF THE CLOCK SIGNAL FREQUENCY LONG
B+ (+9.5V)
B+ (+5V)
MOTOR DRIVE Q404
MOTOR DRIVE Q403
FAST REVERSE
FWD, REVERSE, FF
M1 MOTOR
D415
D416
D412
LAMP DRIVE Q406
PL2 ◀ (REV)
LAMP DRIVE Q405
PL1 ▶ (FWD)
SWITCHING Q408
D404 (II)
D405 (REC)
D581
PM1 HEAD
SOLENOID KICK Q580,581
IC568 (1/5)
AMS TIMING ON/OFF IC568
D565
D567
D566
AMS MODE DETECTOR IC566,567
IC567 (1/2)
IC566 (1/2)
AMS SIGNAL DETECTOR
INVERTER
AMS SIGNAL DETECTOR IC568
IC568 (1/2)
D564
AMS MODE CONTROL IC567 (1/2)

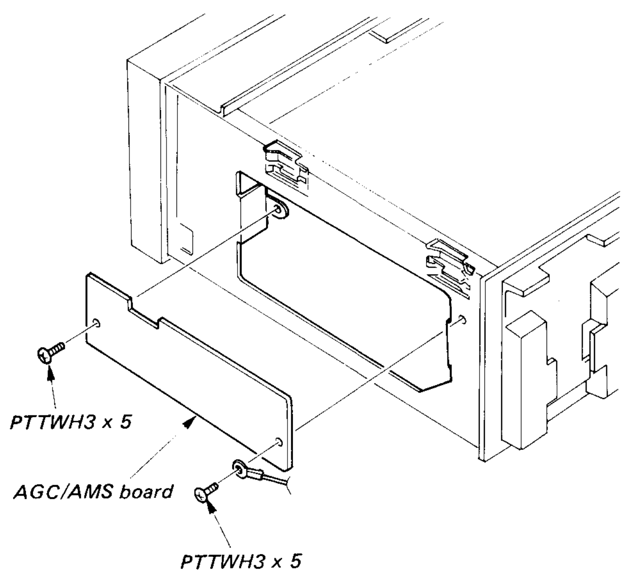
SECTION 4
DISASSEMBLY

Note: Follow the disassembly procedure in the numerical order given.

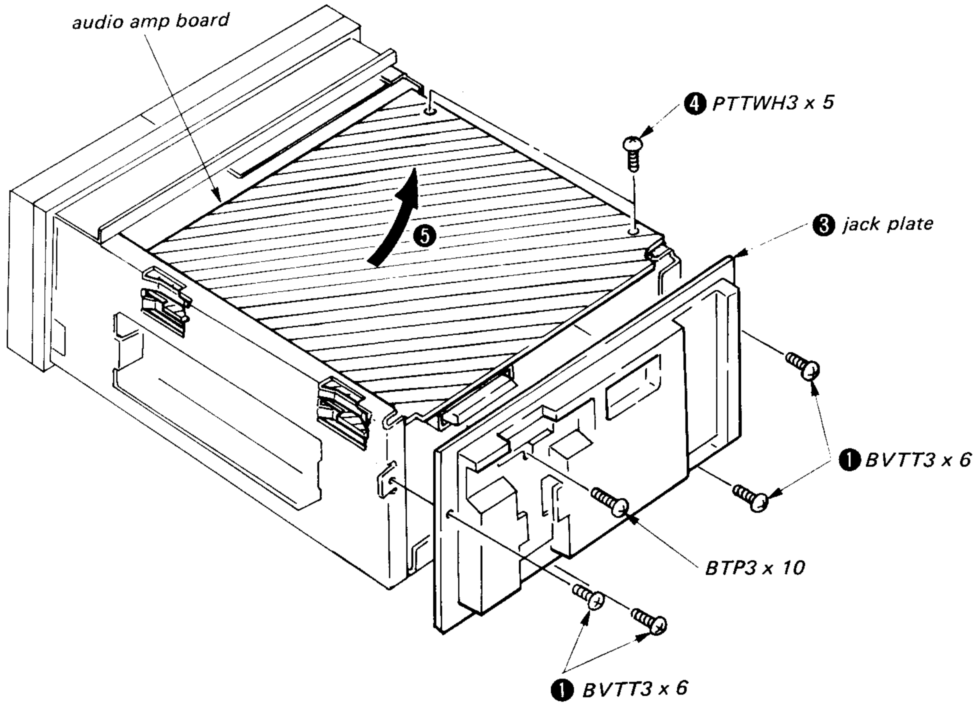
CASE


screw (OS), case, claw
case
screw (OS), case, claw

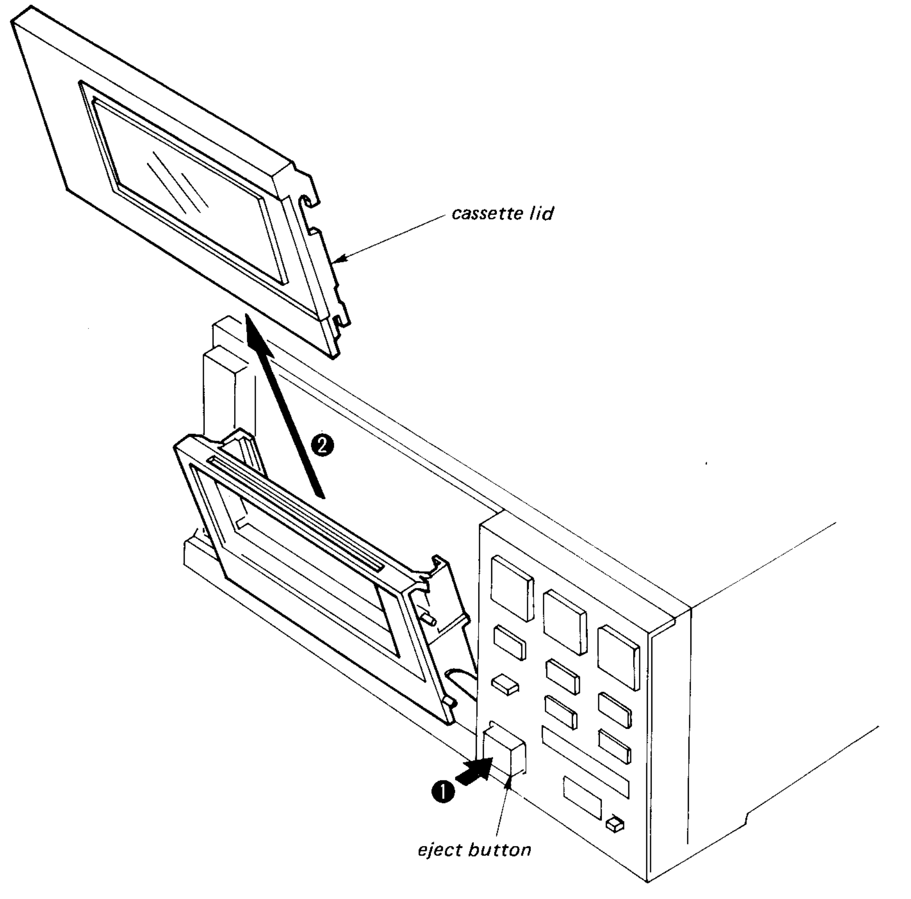
AGC/AMS BOARD


PTTWH3 x 5
AGC/AMS board
PTTWH3 x 5

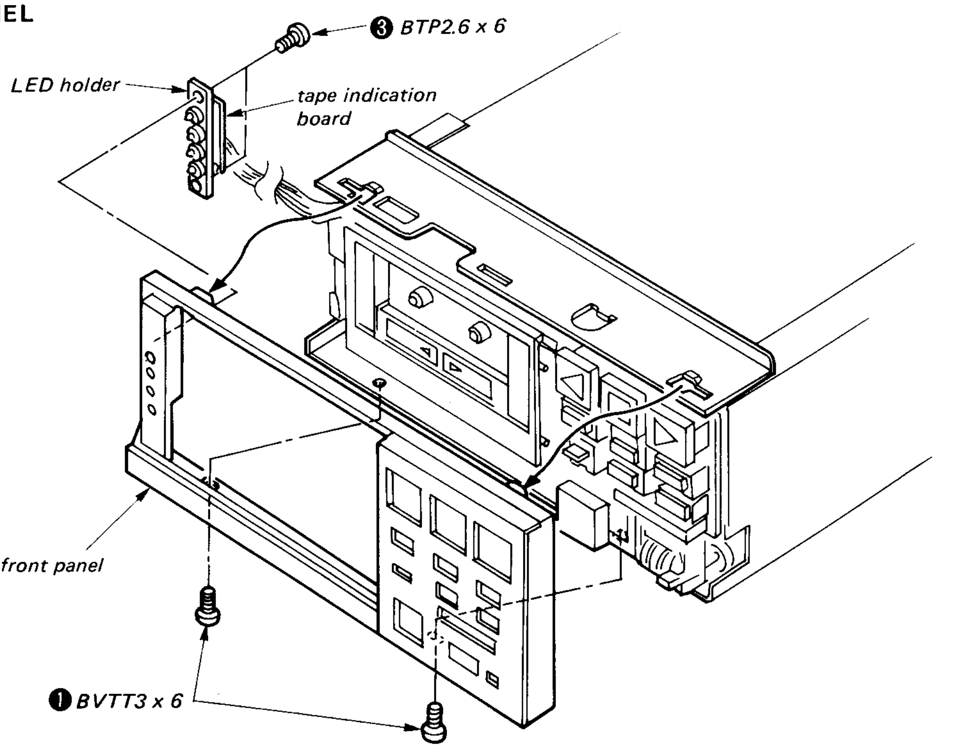
AUDIO AMP BOARD


audio amp board
❹ PTTWH3 x 5
❸ jack plate
❺
❶ BVTT3 x 6
BTP3 x 10
❶ BVTT3 x 6

CASSETTE LID


cassette lid
❷
❶
eject button

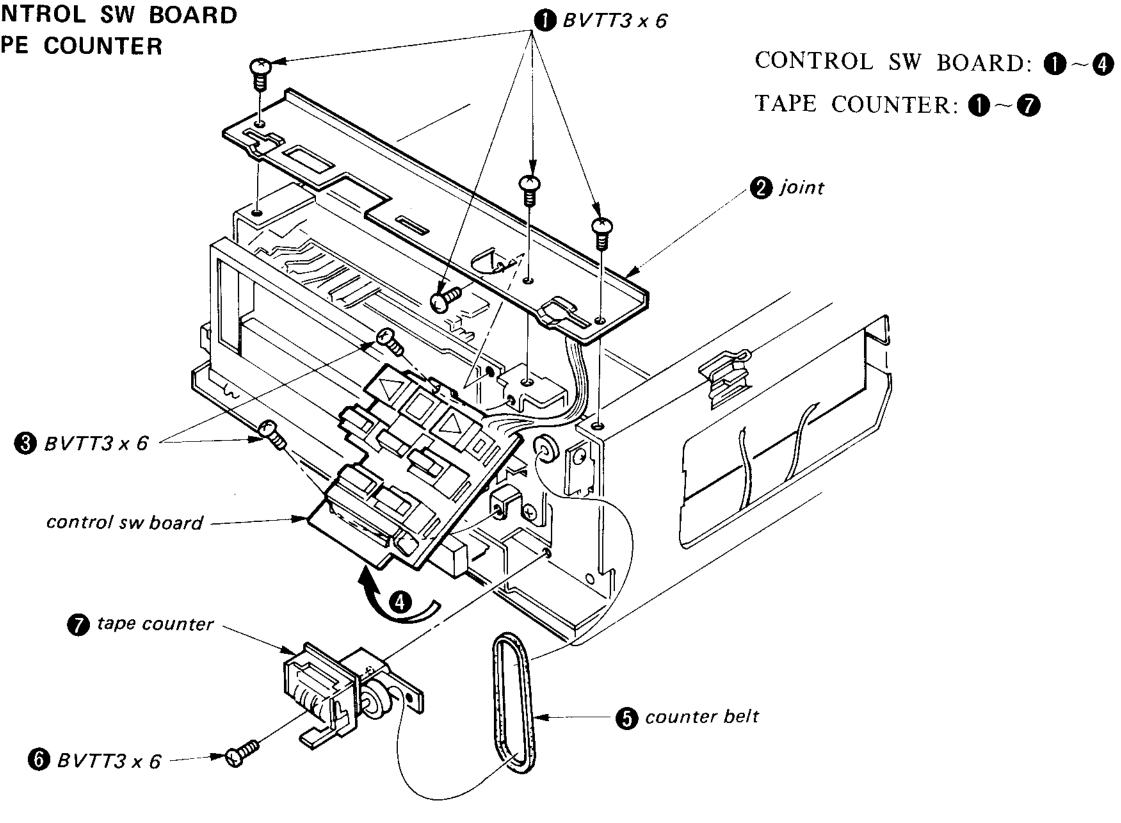
FRONT PANEL


❸ BTP2.6 x 6
LED holder
tape indication board
❷ front panel
❶ BVTT3 x 6

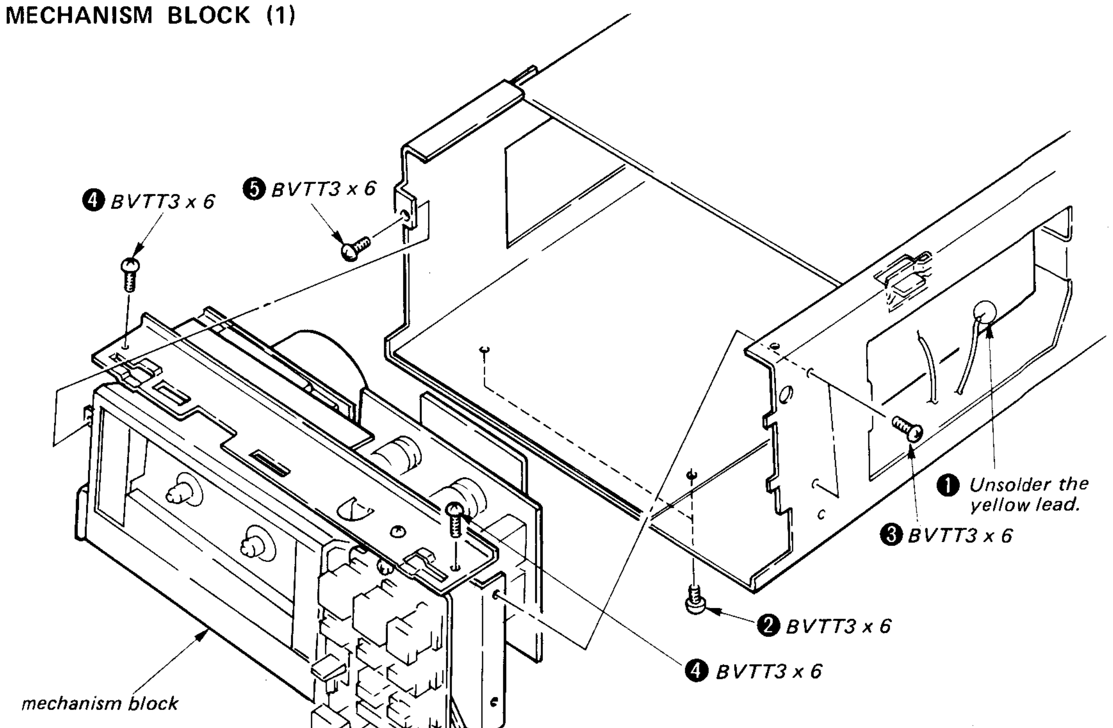
CONTROL SW BOARD
TAPE COUNTER

CONTROL SW BOARD: ❶~❹

TAPE COUNTER: ❶~❼


❶ BVTT3 x 6
❷ joint
❸ BVTT3 x 6
control sw board
❹
❼ tape counter
❺ counter belt
❻ BVTT3 x 6

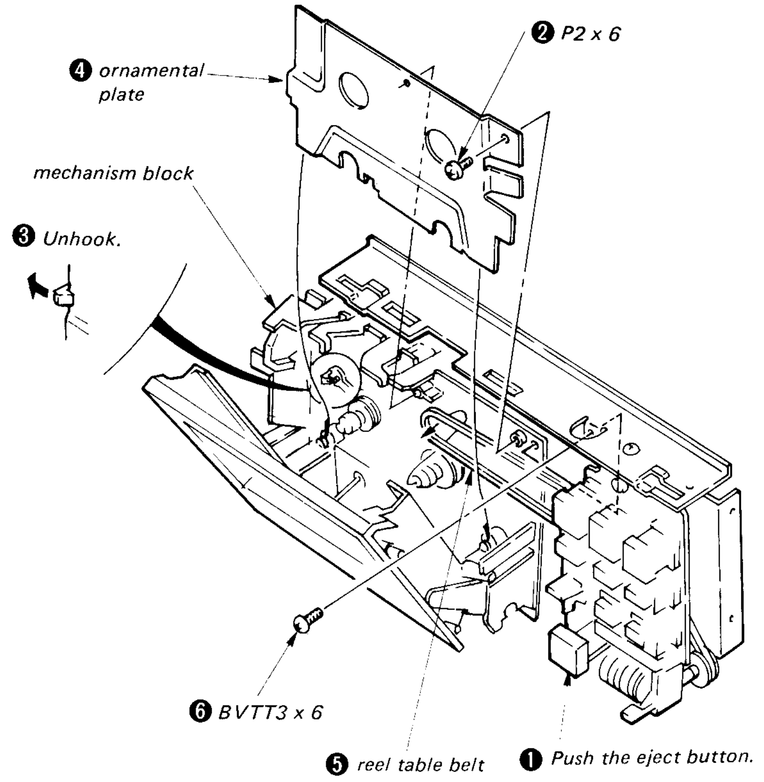
MECHANISM BLOCK (1)


❹ BVTT3 x 6
❺ BVTT3 x 6
❸ BVTT3 x 6
❷ BVTT3 x 6
❹ BVTT3 x 6
mechanism block

❶ Unsolder the yellow lead.

❻ If necessary, remove Audio Amp Board and five connectors. **(Refer to page TC-73, 74)**

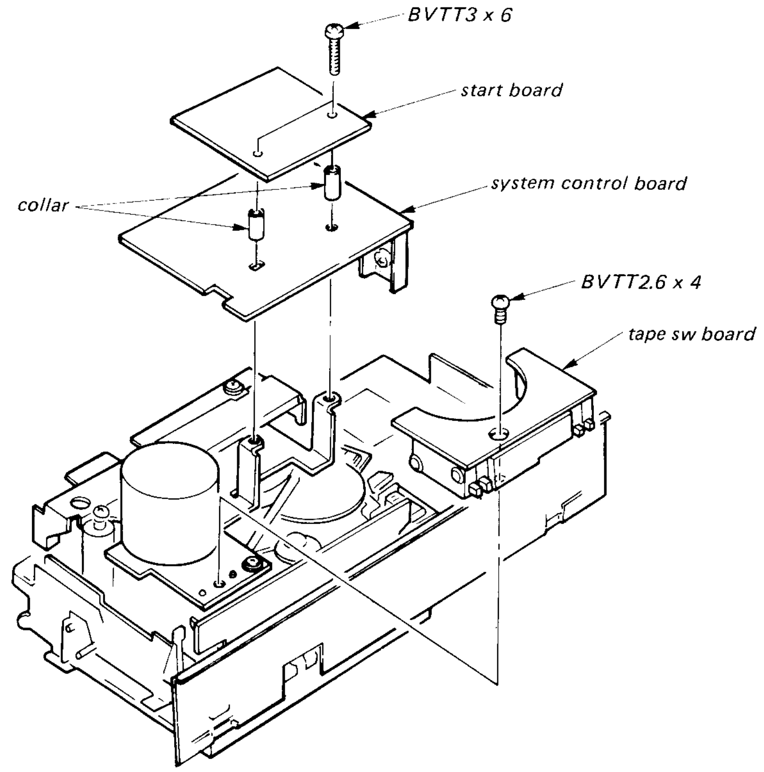
MECHANISM BLOCK (2)


❹ ornamental plate
❷ P2 x 6
mechanism block
❻ BVTT3 x 6
❺ reel table belt

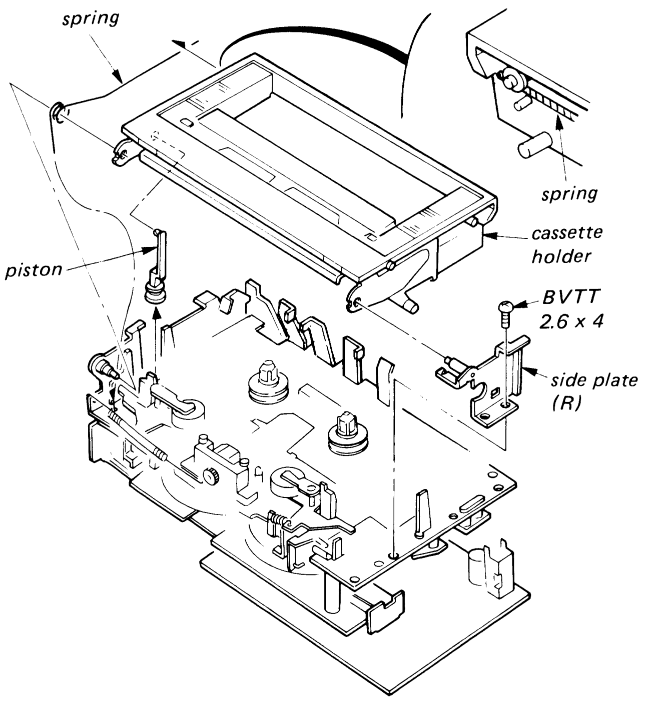
❸ Unhook.

❶ Push the eject button.

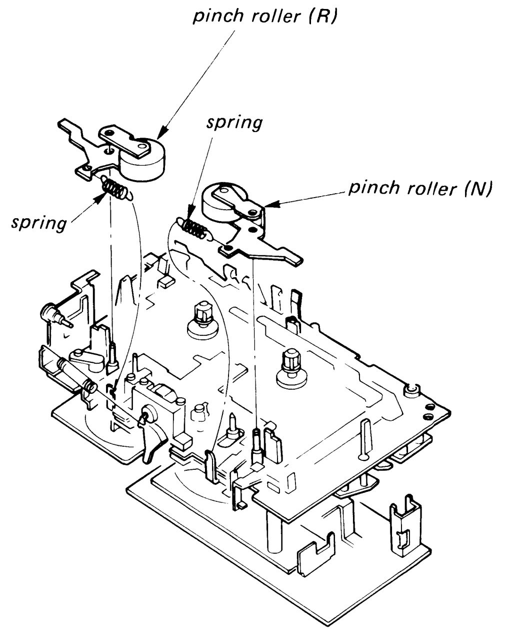
TAPE SW BOARD, START BOARD, SYSTEM CONTROL BOARD


BVTT3 x 6
start board
system control board
collar
BVTT2.6 x 4
tape sw board

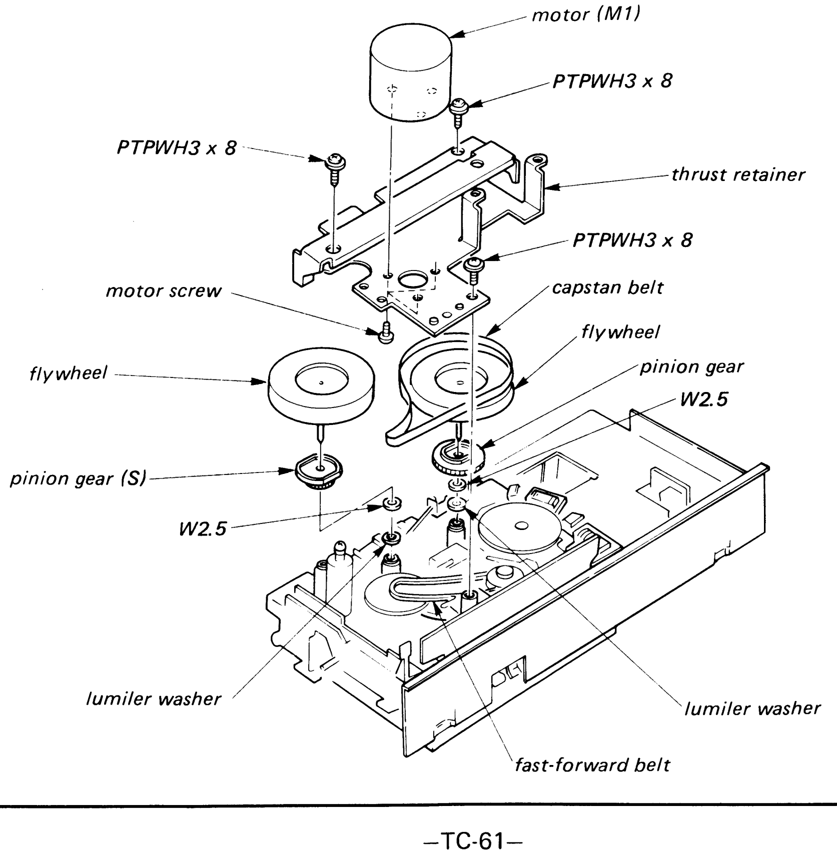
CASSETTE HOLDER


spring
spring
cassette holder
piston
BVTT 2.6 x 4
side plate (R)

PINCH ROLLER


pinch roller (R)
spring
pinch roller (N)
spring

MOTOR, FLYWHEEL


motor (M1)
PTPWH3 x 8
PTPWH3 x 8
thrust retainer
PTPWH3 x 8
motor screw
capstan belt
flywheel
flywheel
pinion gear
W2.5
pinion gear (S)
W2.5
lumiler washer
lumiler washer
fast-forward belt

SECTION 5
ADJUSTMENTS

5-1. MECHANICAL ADJUSTMENTS

PRECAUTION

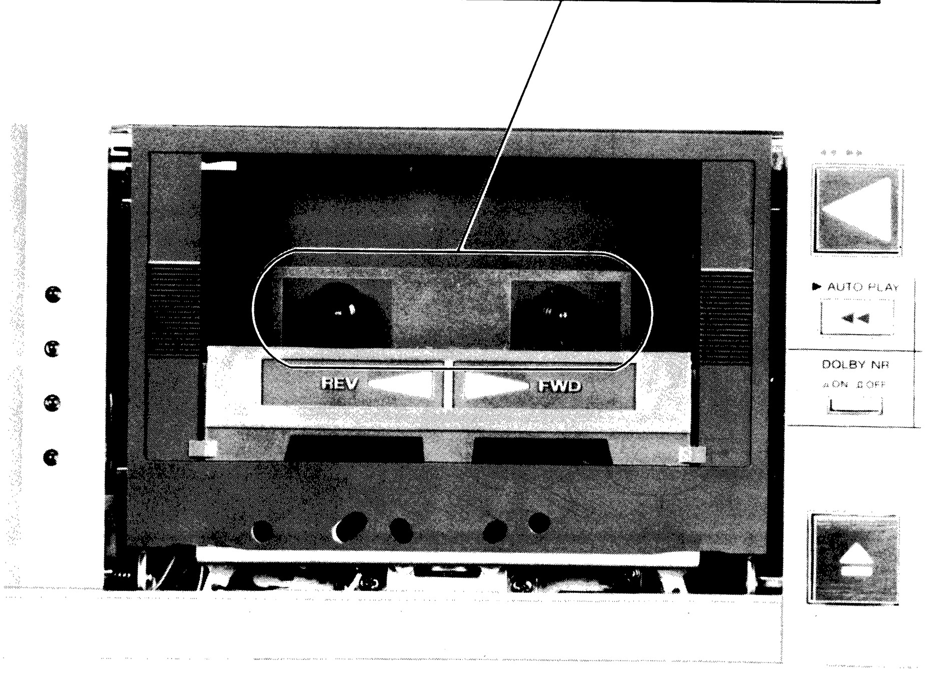
1. Clean the following parts with a denatured-alcohol-moistened swab:

record/playback head	pinch roller
erase head	rubber belts
capstan	idlers

2. Demagnetize the record/playback head with a head demagnetizer.
3. Do not use a magnetized screwdriver for the adjustments.
4. After the adjustments, apply suitable locking compound to the parts adjusted.
5. The adjustments should be performed with the rated power supply voltage (dc 2.5V) unless otherwise noted.

Torque Measurement

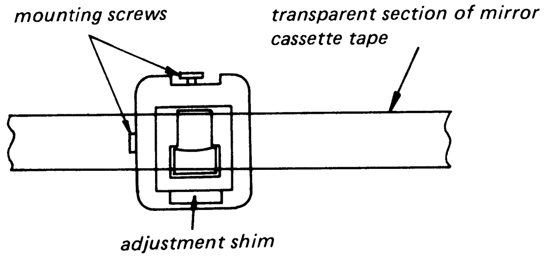
Torque	Torque meter	Meter reading
FWD	CQ-102C	28 – 60 g·cm (0.39 – 0.83 oz·inch)
FWD Back tension	CQ-102C	2 – 8 g·cm (0.03 – 0.1 oz·inch)
REV	CQ-102R	28 – 60 g.cm (0.39 – 0.83 oz·inch)
REV Back tension	CQ-102R	2 – 8 g·cm (0.03 – 0.1 oz·inch)
FF, REW	CQ-201B	80 – 165 g·cm (1.1 – 2.28 oz·inch)

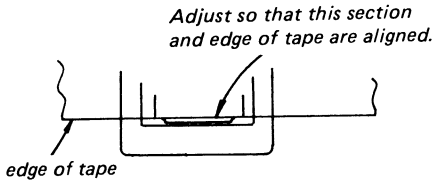


Head Height Adjustment

The following adjustments should be made when the record/playback head is replaced.

1. The head should be made after removing the head pad of the mirror cassette tape.
2. Using the leader section of the mirror cassette tape, adjustments are made by changing the adjusting shim so that the core and the edge of the tape become as shown in the illustration below when the tape is moved across the head.


mounting screws
transparent section of mirror cassette tape
adjustment shim

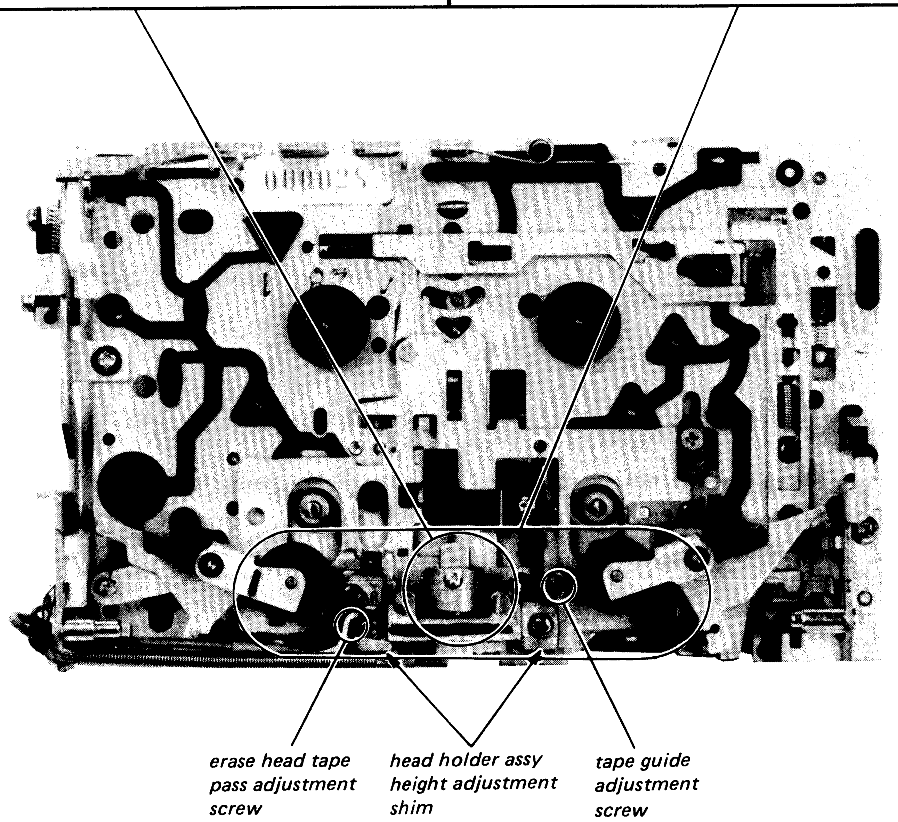

Adjust so that this section and edge of tape are aligned.
edge of tape

enlarged view of head

Tape Path Adjustment

When assembling the erase head and head holder, and when replacing the tape guide (L), be sure to perform the following adjustments.

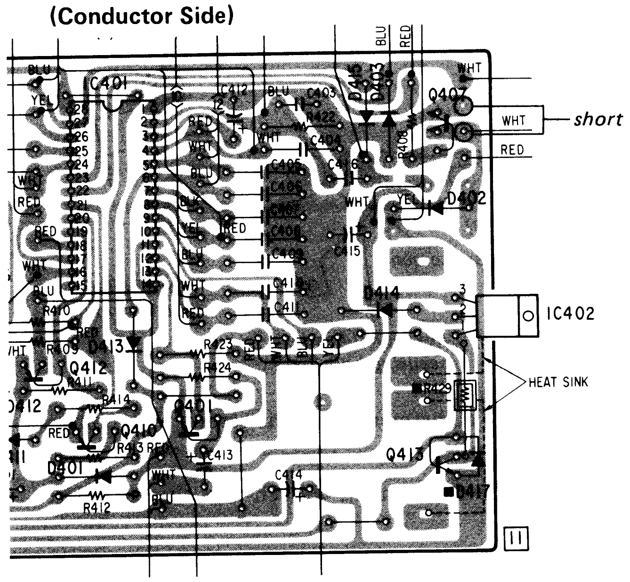
1. Using a mirror cassette, adjust each of the adjustment screws until there is not tape curling.
2. Perform adjustments by changing the height adjustment shim of the head holder assembly and the height adjustment shim of the record/playback head, so that the core of the record/playback head is positioned correctly for both FWD and REV.


erase head tape pass adjustment screw
head holder assy height adjustment shim
tape guide adjustment screw

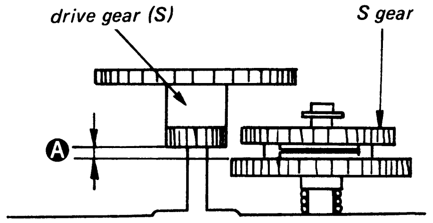
Supply Gear Retainer Position Adjustment

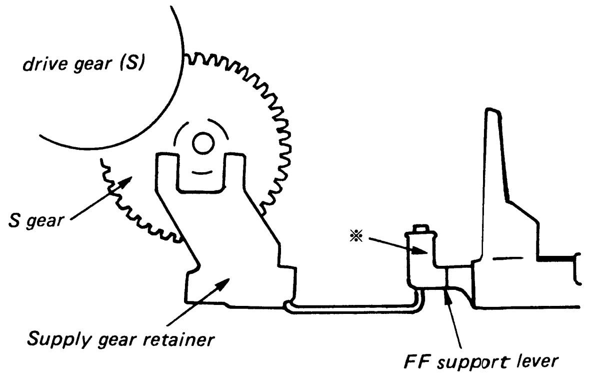
1. With the deck in the REV mode, short the collector and emitter of Q407 (this will place the deck in the pause state of the REV mode).

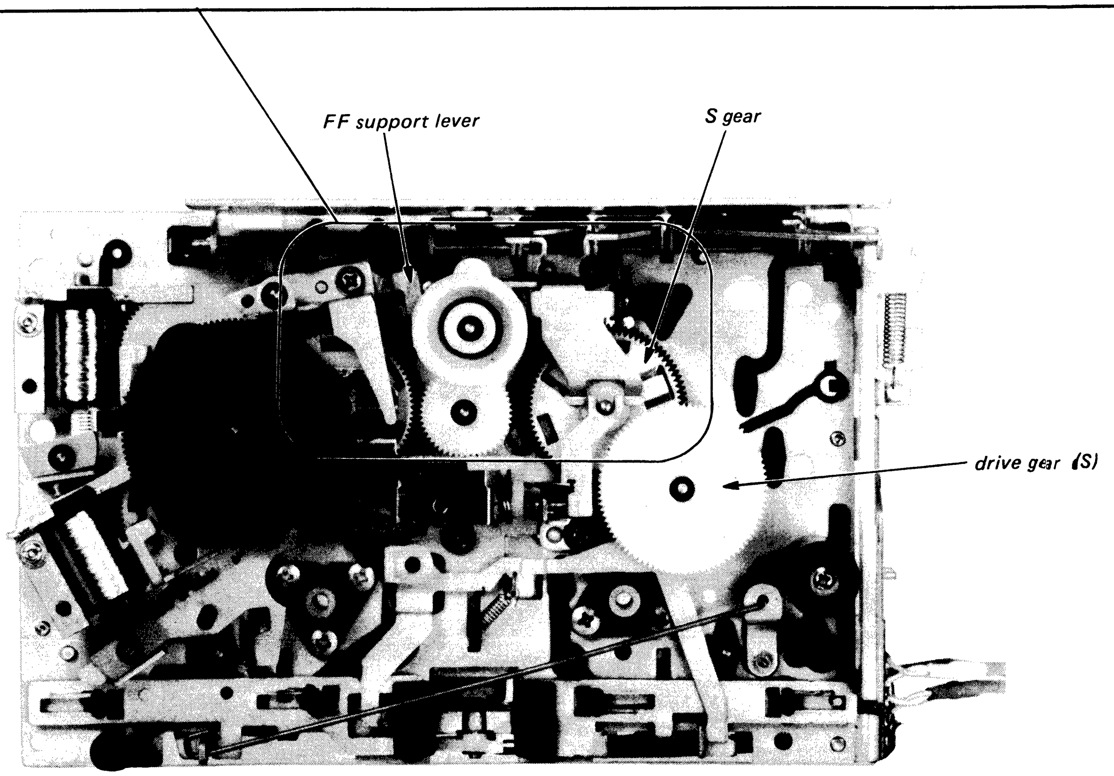
- **System Control Board (Conductor Side)**


short
Q407
WHT
RED
IC401
IC402
HEAT SINK
D402
Q412
Q413
Q410
D401
Q411
D417
D413
D414
C401
C403
C404
C405
C406
C407
C408
C409
C410
C411
C414
C415
R410
R412
R414
R423
R424
BLU
YEL
RED
WHT
II

2. Bend the FF supplementary lever at the place indicated by the asterik (※) to make adjustments so that the dimension of Ⓐ is 1mm, ±0.5mm.
3. After completing this adjustment, remove the shorting wire.


drive gear (S)
S gear
Ⓐ

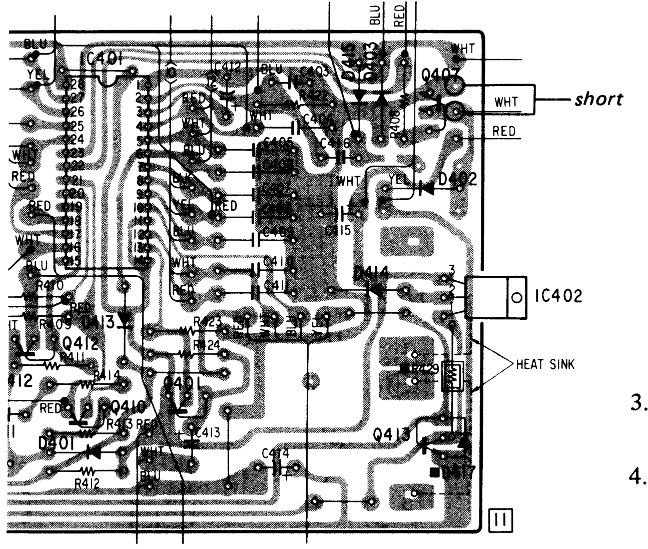

drive gear (S)
S gear
※
Supply gear retainer
FF support lever


FF support lever
S gear
drive gear (S)

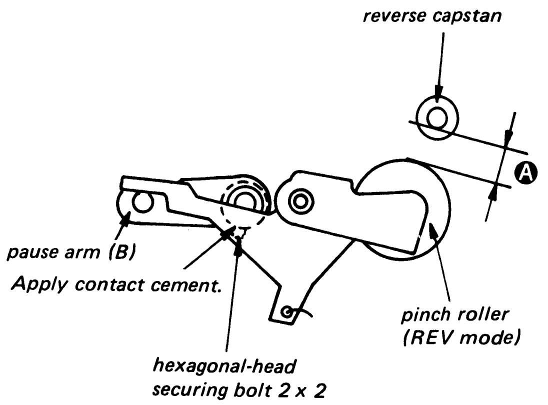
Pause Arm Position Adjustment

1. With the deck in the REV mode, short the collector and emitter of Q407 (this will place the deck in the pause state of the REV mode).

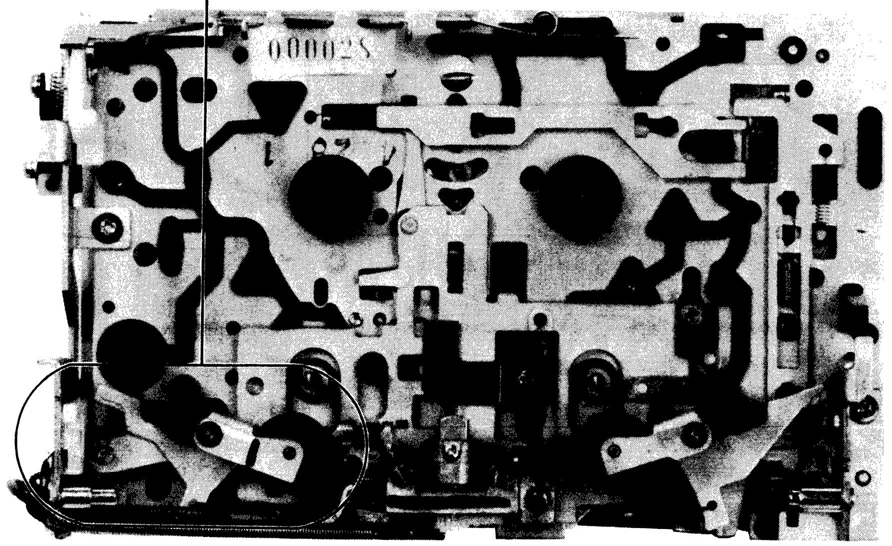
- **System Control Board (Conductor Side)**


short
WHT
RED
Q407
IC402
HEAT SINK
BLU
YEL
C401
D402
Q401
Q412
Q413
Q414
Q415
Q410
R412
C413
C414
11

2. Loosen the hexagonal head securing bolts and adjust the position of the pause arm B so that the dimension of Ⓐ below becomes 0.5mm – 1.0mm.


reverse capstan
Ⓐ
pause arm (B)
Apply contact cement.
pinch roller
(REV mode)
hexagonal-head
securing bolt 2 x 2

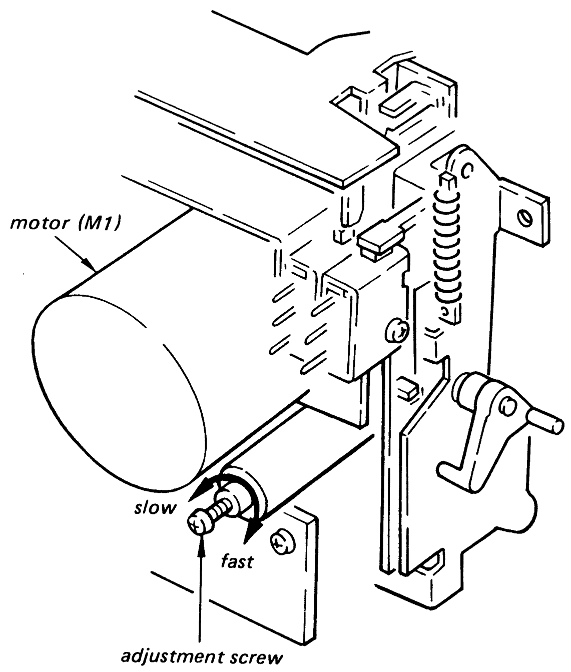
3. After the adjustment, lock the screws with contact cement.
4. After the adjustment, detach the shorting wire.



Cassette Holder Opening/Closing Speed Adjustment

1. Insert a CHF-90 or equivalent tape (in terms of weight).
2. Adjust the adjustment screw so that the time required for the cassette holder is 0.4 – 2.5 seconds when the EJECT button is depressed.

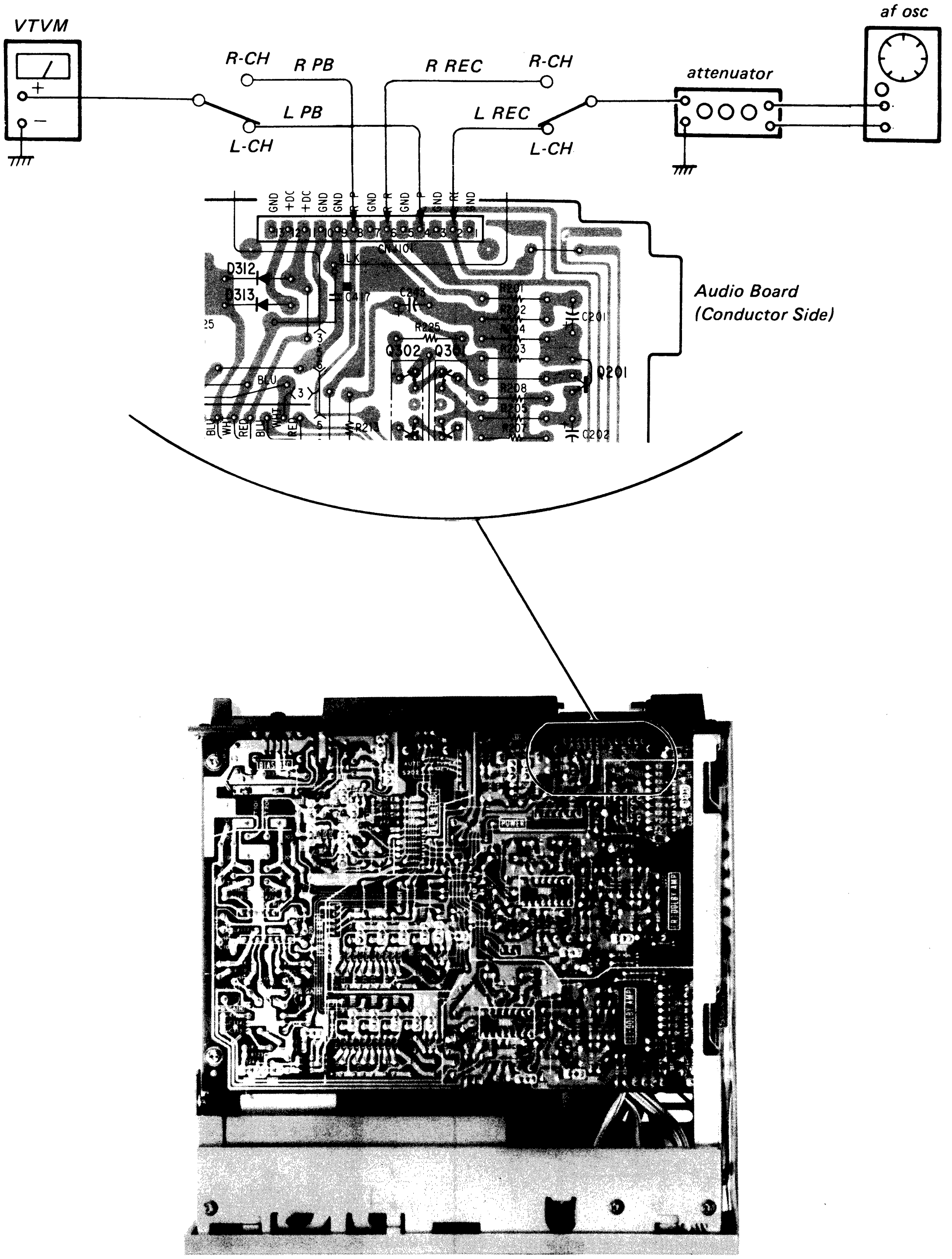
Adjustment Location:


motor (M1)
slow
fast
adjustment screw

5-2. ELECTRICAL ADJUSTMENTS

Note: The adjustment should be performed in the order given in this service manual. (Playback section may be adjusted earlier than record section.)
The adjustments should be performed for both L-CH and R-CH.

- **Output level check point**
- **Input level check point**


VTVM
af osc
attenuator
R-CH
R PB
R REC
R-CH
L PB
L REC
L-CH
L-CH
GND
+DC
+DC
GND
GND
GND
GND
GND
CN101
D312
D313
C417
R225
Q302
Q301
Q201
C201
C202
R211
BLU
WHT
RED
Audio Board
(Conductor Side)

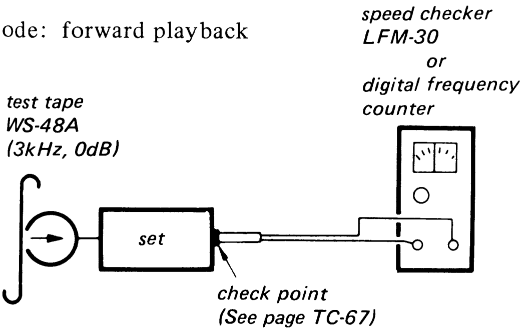
Tape Speed Adjustment

Setting:

TAPE SELECTOR switch: AUTO
DOLBY NR: OFF

Procedure:

Mode: forward playback

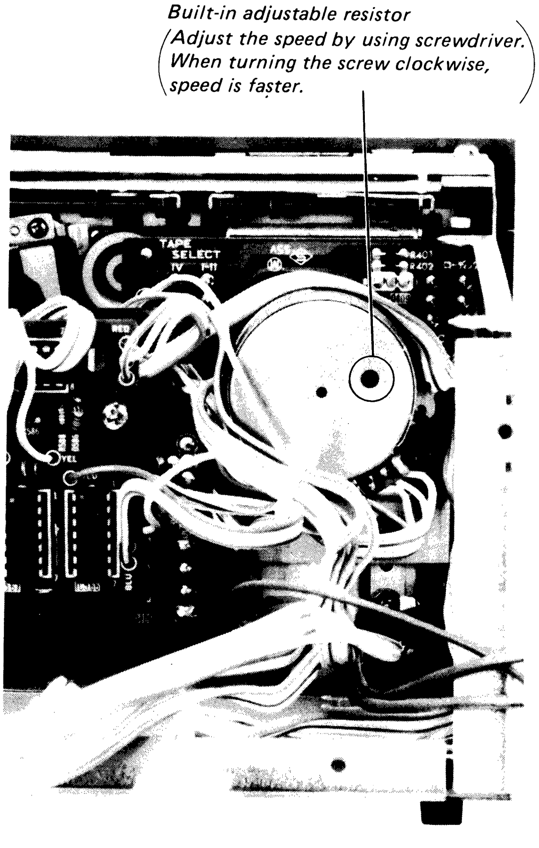

speed checker
LFM-30
or
digital frequency
counter
test tape
WS-48A
(3kHz, 0dB)
set
check point
(See page TC-67)

Specifications:

Speed checker	Digital frequency counter
±0.5%	2,985 – 3,015Hz

Frequency difference between the beginning and the end of the tape should be within 1% (30Hz).

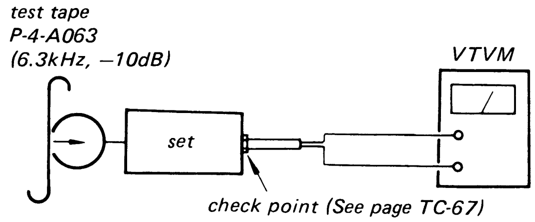
Adjustment Location: Motor (M1)


Built-in adjustable resistor
(Adjust the speed by using screwdriver. When turning the screw clockwise, speed is faster.)

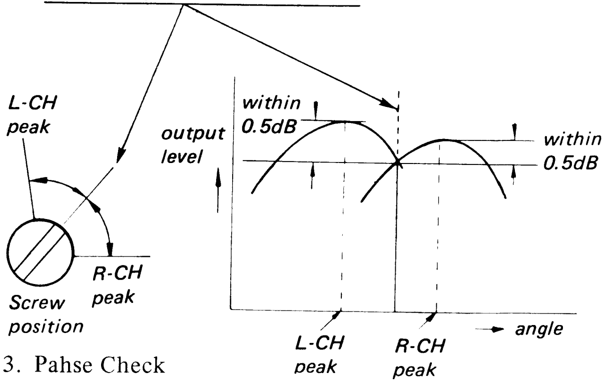
Forward Record/playback Head Azimuth Adjustment

Procedure:

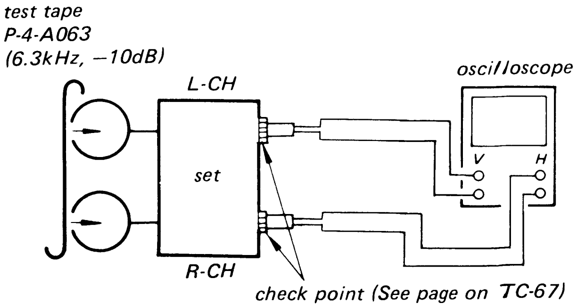
1. Mode: forward playback

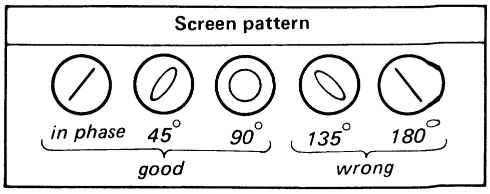

test tape
P-4-A063
(6.3kHz, –10dB)
VTVM
set
check point (See page TC-67)

2. Turn the adjustment screw for the maximum output levels. If these levels do not match, turn the adjustment screw until both of output levels match together within 0.5dB.


L-CH
peak
R-CH
peak
Screw
position
output
level
within
0.5dB
within
0.5dB
L-CH
peak
R-CH
peak
angle

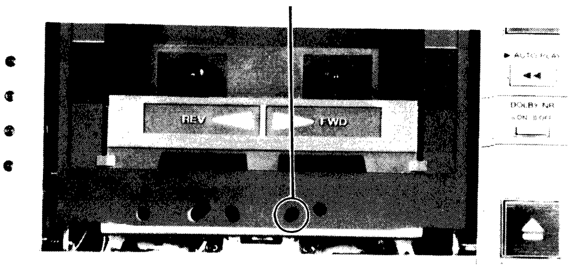
3. Pahse Check
   Mode: forward playback


test tape
P-4-A063
(6.3kHz, –10dB)
L-CH
set
R-CH
oscilloscope
V
H
check point (See page on TC-67)


Screen pattern
in phase
45°
90°
135°
180°
good
wrong

4. After the adjustment, lock the screws with locking compound.

Adjustment Location:

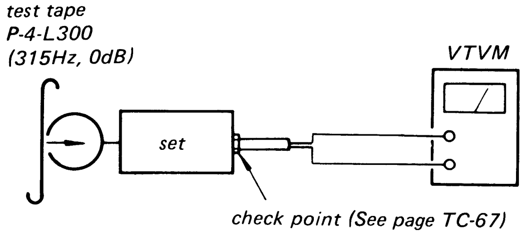

adjustment screw
REV
FWD

Playback Level Adjustment

Setting.

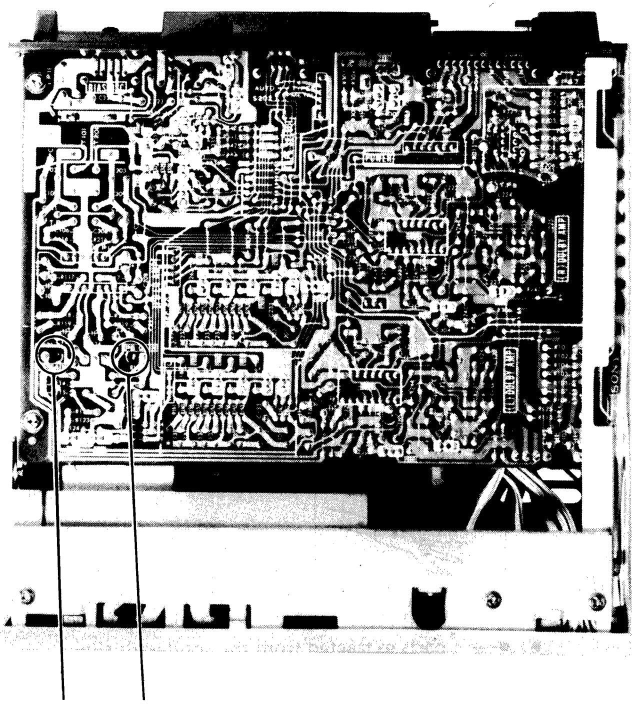
DOLBY NR switch: OFF
TAPE SELECTOR switch: AUTO

Procedure:


test tape
P-4-L300
(315Hz, 0dB)
VTVM
set
check point (See page TC-67)

Adjust RV101 (L-CH) and RV201 (R-CH) to obtain 0.29 – 0.32V (–7.5 to –8.5dB) on the VTVM.
Check that the Line out level does not change in playback mode while changing the mode from playback to stop several times.

Adjustment Location: Audio Board

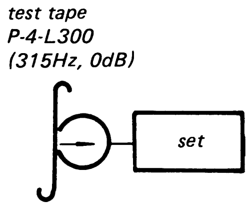

RV101 RV201
(L-CH) (R-CH)

playback level adjustment

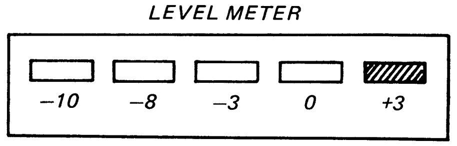
Level Meter Calibration

Proceudre:

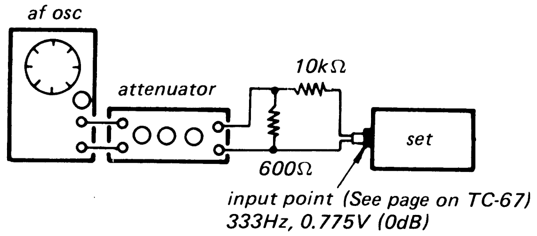
1. Mode: playback


test tape
P-4-L300
(315Hz, 0dB)
set

2. Adjust RV301 so that the most-rightside segment (+3dB) of the LED meter goes on and again turn it in the reverse direction until the segment just goes off.

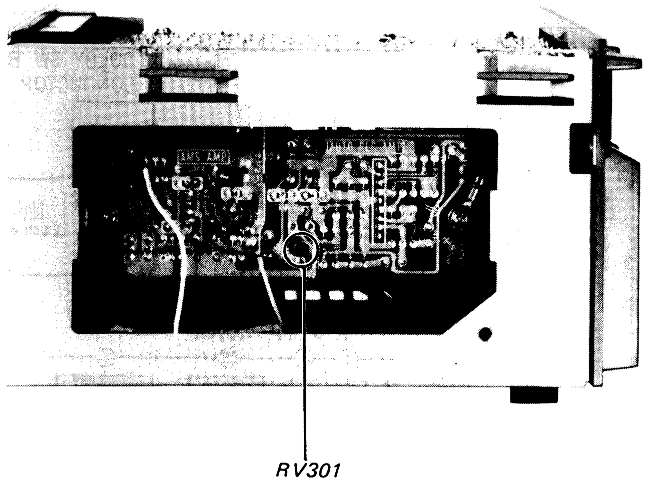

LEVEL METER
–10
–8
–3
0
+3

3. Mode: record


af osc
attenuator
10kΩ
600Ω
set
input point (See page on TC-67)
333Hz, 0.775V (0dB)

Make sure that all LEDs of level meter go on.

Adjustment Location: Audio Board



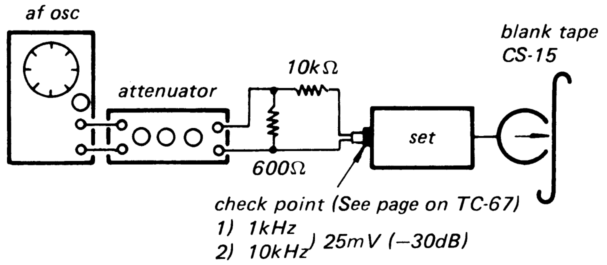
Record Bias Adjustment

Setting:

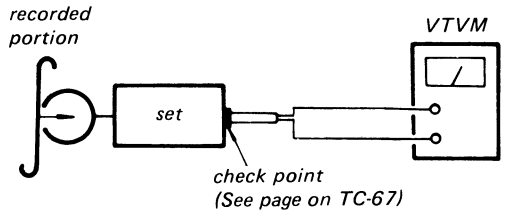
DOLBY NR switch: OFF
TAPE SELECTOR switch: AUTO
ISS switch: 1

Procedure:

1. Mode: record


af osc
attenuator
10kΩ
600Ω
set
blank tape
CS-15
check point (See page on TC-67)
1) 1kHz
2) 10kHz 25mV (–30dB)

2. Mode: playback

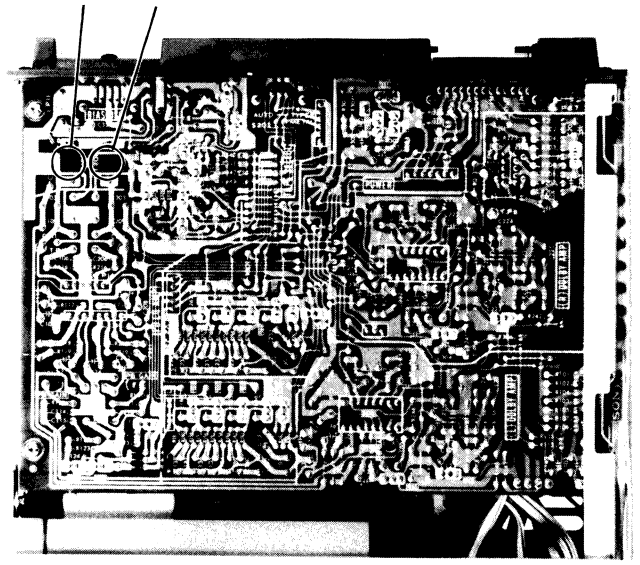

recorded
portion
VTVM
set
check point
(See page on TC-67)

Adjust CT101 (L-CH), CT201 (R-CH) so that the measurement point level of 10kHz signal in 0dB relative to that of 1kHz.

Adjustment Location: audio board

Record Bias adjustment

CT101 CT201
(L-CH) (R-CH)



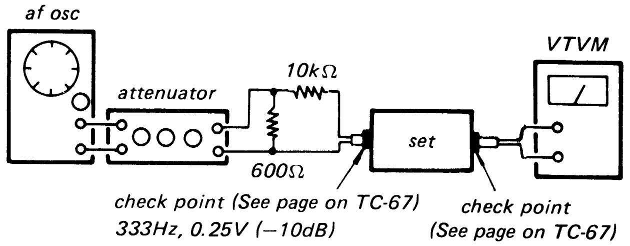
Record Level Adjustment

Setting:

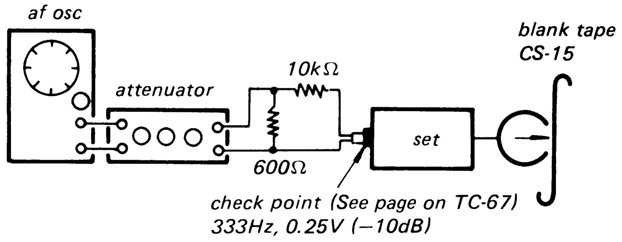
DOLBY NR switch: OFF
TAPE SELECTOR switch: AUTO
ISS switch: 1

Procedure:

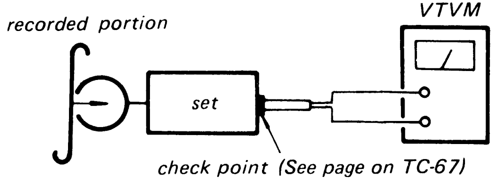
1. Mode: record


af osc
attenuator
10kΩ
600Ω
VTVM
set
check point (See page on TC-67)
333Hz, 0.25V (–10dB)
check point
(See page on TC-67)

2. Mode: record

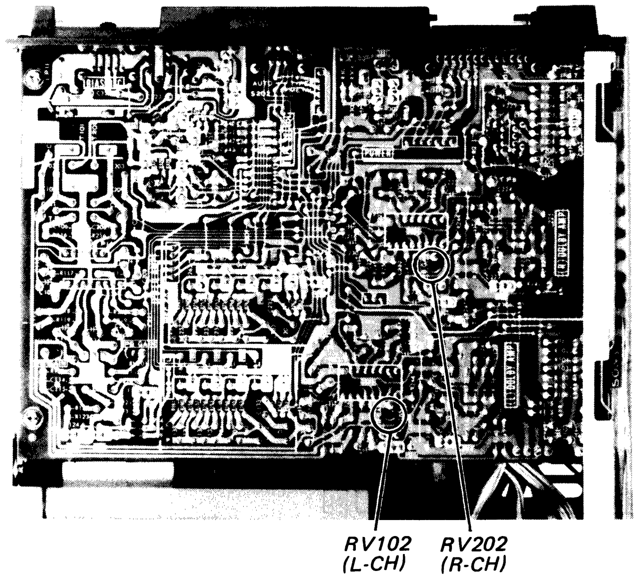

af osc
attenuator
10kΩ
600Ω
set
blank tape
CS-15
check point (See page on TC-67)
333Hz, 0.25V (–10dB)

3. Mode: playback


recorded portion
VTVM
set
check point (See page on TC-67)

4. Adjust RV102 (L-CH) and RV202 (R-CH) so that playback output level of step 3 is 0 ±0.5dB relative to that of step 1.

Adjustment Location: audio board

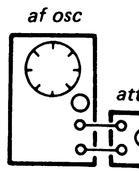

RV102 RV202
(L-CH) (R-CH)

record level adjustment

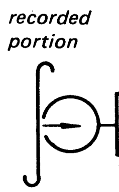
Reverse Playb

Procedure:

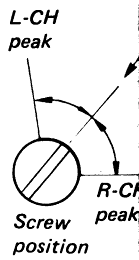
1. Mode: rec



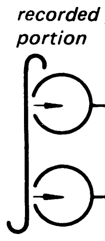
2. Mode: rev

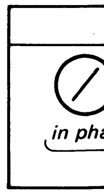

recorded
portion

3. Turn the
output le
the adjust
match tog


L-CH
peak
R-CH
peak
Screw
position

4. Pahse Chec
Mode: rev

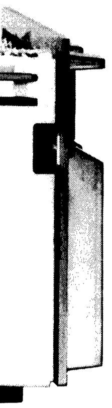

recorded
portion



5. After the
compound

gment
again
gment

n TC-67)



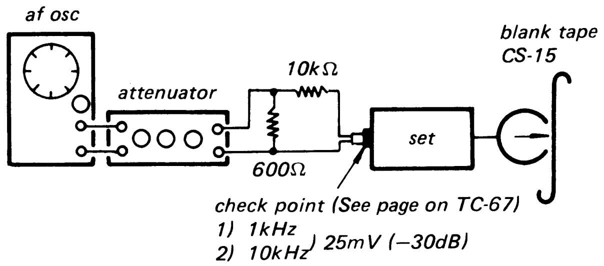
Record Bias Adjustment

Setting:

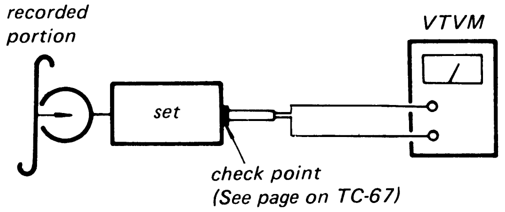
DOLBY NR switch:	OFF
TAPE SELECTOR switch:	AUTO
ISS switch:	1

Procedure:

1. Mode: record

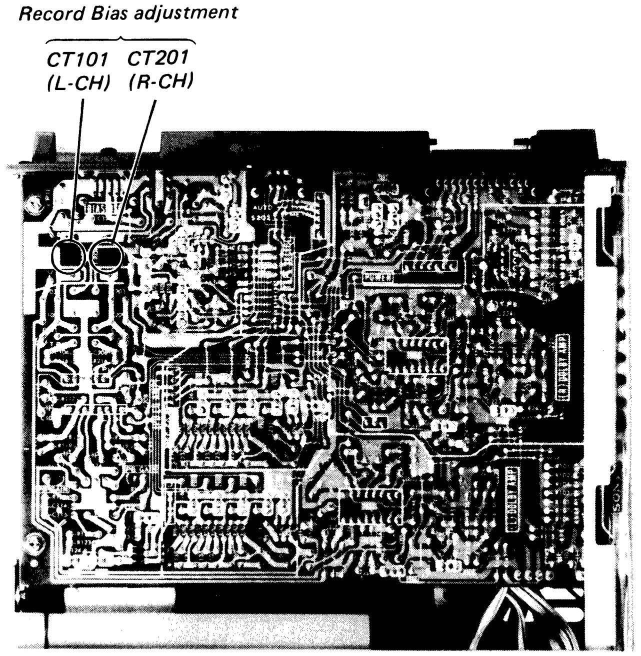

af osc
attenuator
10kΩ
600Ω
set
blank tape CS-15
check point (See page on TC-67)
1) 1kHz
2) 10kHz 25mV (−30dB)

2. Mode: playback


recorded portion
VTVM
set
check point (See page on TC-67)

Adjust CT101 (L-CH), CT201 (R-CH) so that the measurement point level of 10kHz signal in 0dB relative to that of 1kHz.

Adjustment Location: audio board


Record Bias adjustment
CT101 (L-CH)
CT201 (R-CH)

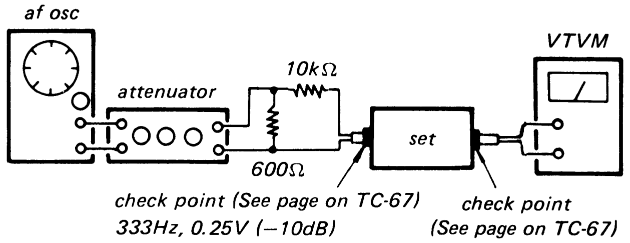
Record Level Adjustment

Setting:

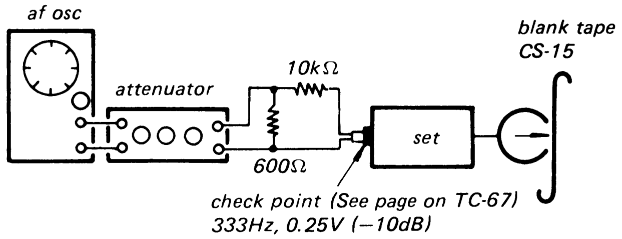
DOLBY NR switch:	OFF
TAPE SELECTOR switch:	AUTO
ISS switch:	1

Procedure:

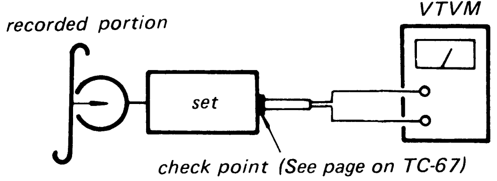
1. Mode: record


af osc
attenuator
10kΩ
600Ω
set
VTVM
check point (See page on TC-67)
333Hz, 0.25V (−10dB)
check point (See page on TC-67)

2. Mode: record

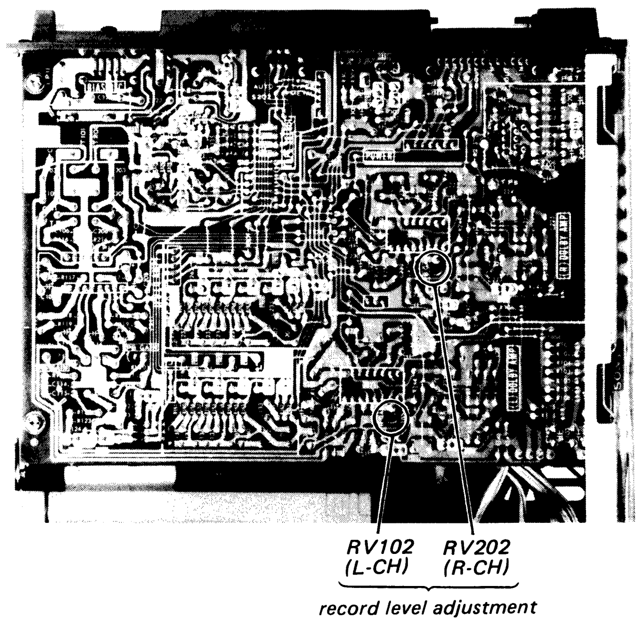

af osc
attenuator
10kΩ
600Ω
set
blank tape CS-15
check point (See page on TC-67)
333Hz, 0.25V (−10dB)

3. Mode: playback


recorded portion
VTVM
set
check point (See page on TC-67)

4. Adjust RV102 (L-CH) and RV202 (R-CH) so that playback output level of step 3 is 0 ±0.5dB relative to that of step 1.

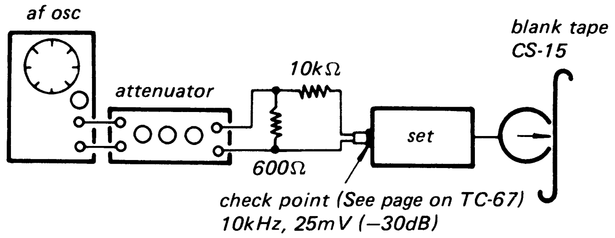
Adjustment Location: audio board


RV102 (L-CH)
RV202 (R-CH)
record level adjustment

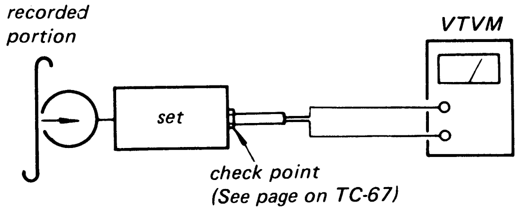
Reverse Playback Head Azimuth Adjustment

Procedure:

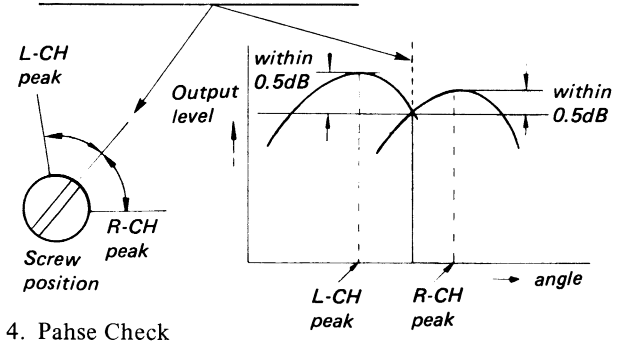
1. Mode: record


af osc
attenuator
10kΩ
600Ω
set
blank tape CS-15
check point (See page on TC-67)
10kHz, 25mV (−30dB)

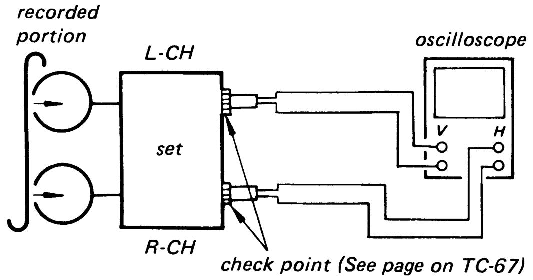
2. Mode: reverse playback

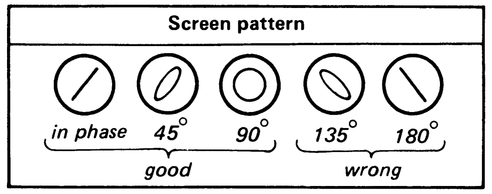

recorded portion
VTVM
set
check point (See page on TC-67)

3. Turn the adjustment screw for the maximum output levels. If these levels do not match, turn the adjustment screw until both of output levels match together within 0.5dB.


L-CH peak
R-CH peak
Screw position
Output level
within 0.5dB
within 0.5dB
L-CH peak
R-CH peak
angle

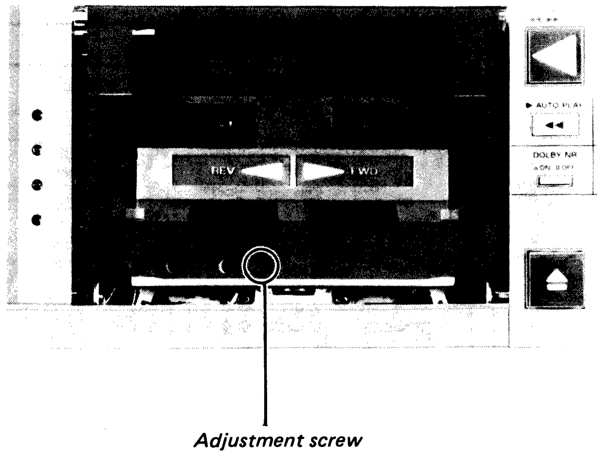
4. Pahse Check
   Mode: reverse playback


recorded portion
L-CH
R-CH
set
oscilloscope
V
H
check point (See page on TC-67)


Screen pattern
in phase
45°
90°
135°
180°
good
wrong

5. After the adjustment, lock the screws with locking compound.

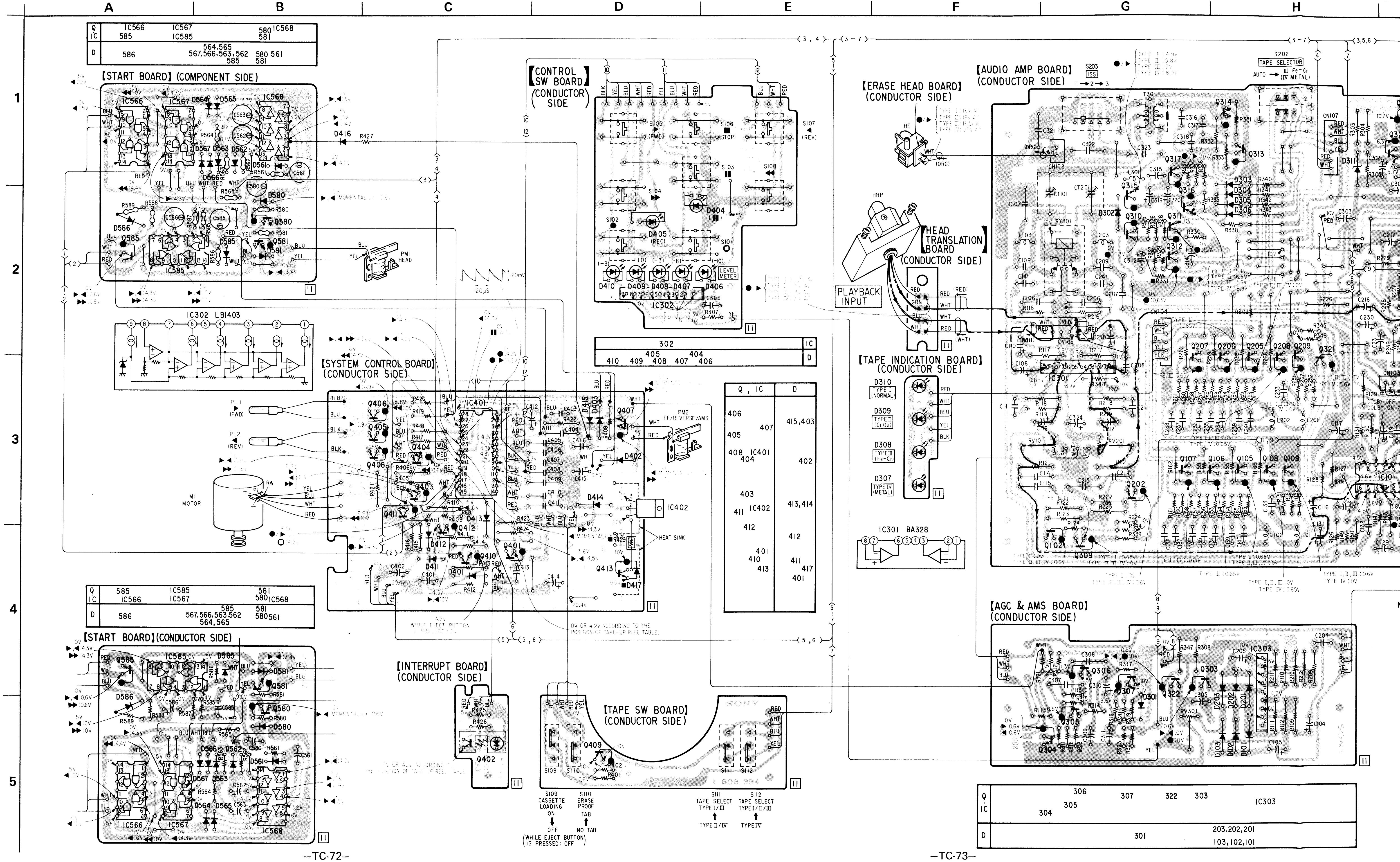
Adjustment Location:


REV
FWD
Adjustment screw

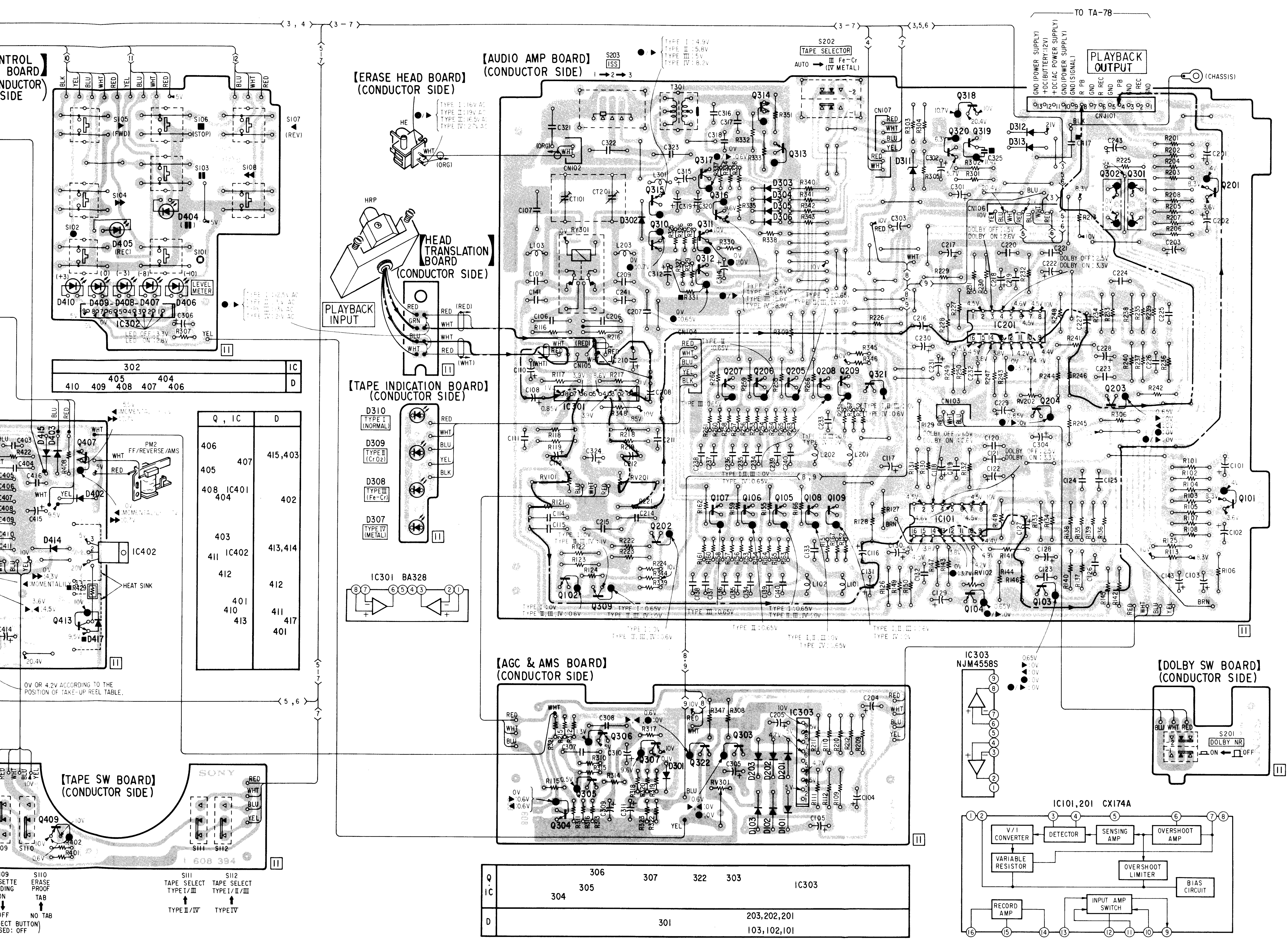
SECTION 6
DIAGRAMS

6-1. MOUNTING DIAGRAM

- See page TC-81 for Semiconductor lead layout.


A
B
C
D
E
F
G
H
1
2
3
4
5
【START BOARD】(COMPONENT SIDE)
Q IC: IC566 585 IC567 IC585 580 581 IC568
D: 586 564,565 567,566,563,562 585 580 581 561
PM1 HEAD
IC302 LB1403
【CONTROL SW BOARD】(CONDUCTOR SIDE)
S105 (FWD)
S106 (STOP)
S107 (REV)
S103
S108
S104
S102
S101
D404
D405 (REC)
D410 D409-D408-D407 D406
LEVEL METER
IC302
302 IC
410 409 405 408 407 404 406 D
120mV
120μs
【SYSTEM CONTROL BOARD】(CONDUCTOR SIDE)
PL1 (FWD)
PL2 (REV)
M1 MOTOR
IC401
IC402
HEAT SINK
PM2 FF/REVERSE/AMS
Q , IC
D
406 405 407 408 IC401 404 403 411 IC402 412 401 410 413
415,403 402 413,414 412 411 417 401
【INTERRUPT BOARD】(CONDUCTOR SIDE)
Q402
【TAPE SW BOARD】(CONDUCTOR SIDE)
S109 CASSETTE LOADING ON ↓ OFF (WHILE EJECT BUTTON IS PRESSED: OFF)
S110 ERASE PROOF TAB ↑ NO TAB
S111 TAPE SELECT TYPE I/III ↑ TYPE II/IV
S112 TAPE SELECT TYPE I/II/III ↑ TYPE IV
【START BOARD】(CONDUCTOR SIDE)
Q IC: 585 IC566 IC585 IC567 581 580 IC568
D: 586 585 567,566,563,562 564,565 581 580 561
【ERASE HEAD BOARD】(CONDUCTOR SIDE)
HE
HRP
【HEAD TRANSLATION BOARD】(CONDUCTOR SIDE)
PLAYBACK INPUT
【TAPE INDICATION BOARD】(CONDUCTOR SIDE)
D310 TYPE I (NORMAL)
D309 TYPE II (CrO2)
D308 TYPE III (Fe-Cr)
D307 TYPE IV (METAL)
IC301 BA328
【AUDIO AMP BOARD】(CONDUCTOR SIDE)
S203 ISS
S202 TAPE SELECTOR AUTO → III Fe-Cr (IV METAL)
IC301
IC101
【AGC & AMS BOARD】(CONDUCTOR SIDE)
IC303
Q IC: 306 305 304 307 322 303 IC303
D: 301 203,202,201 103,102,101

r Semiconductor lead layout.


D
E
F
G
H
I
J
K
1
2
3
4
5
NTROL BOARD
NDUCTOR SIDE
[AUDIO AMP BOARD]
(CONDUCTOR SIDE)
[ERASE HEAD BOARD]
(CONDUCTOR SIDE)
[HEAD TRANSLATION BOARD]
(CONDUCTOR SIDE)
PLAYBACK INPUT
[TAPE INDICATION BOARD]
(CONDUCTOR SIDE)
TO TA-78
PLAYBACK OUTPUT
S202 TAPE SELECTOR
S203 ISS
[AGC & AMS BOARD]
(CONDUCTOR SIDE)
[TAPE SW BOARD]
(CONDUCTOR SIDE)
[DOLBY SW BOARD]
(CONDUCTOR SIDE)
S201 DOLBY NR ON OFF
IC301 BA328
IC303 NJM4558S
IC101,201 CX174A
V/I CONVERTER
DETECTOR
SENSING AMP
OVERSHOOT AMP
VARIABLE RESISTOR
OVERSHOOT LIMITER
BIAS CIRCUIT
RECORD AMP
INPUT AMP SWITCH
PM2 FF/REVERSE/AMS
HEAT SINK
LEVEL METER
S111 TAPE SELECT TYPE I/III
S112 TAPE SELECT TYPE I/II/III
TYPE II/IV
TYPE IV
S110 ERASE PROOF TAB NO TAB
0V OR 4.2V ACCORDING TO THE POSITION OF TAKE-UP REEL TABLE.

	IC
302	IC
405 404 410 409 408 407 406	D

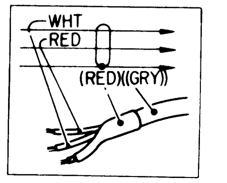
Q , IC	D
406	
407	415,403
405	
408 IC401 404	402
403	
411 IC402	413,414
412	412
401 410 413	411 417 401

Q IC	306 305 304	307	322	303	IC303
D		301		203,202,201 103,102,101	

Q , IC	D
314 318	
	312
320, 319	313
	311
317	
201	303
315 316 302,301	304
	305 302,306
310, 311	
312	
IC201	
207,206,205,208,209 IC301 321 203	
204	
101	
107,106,105,108,109 IC101	
202	
102, 309	
104 103	

Note:

- Color code of sleeving over the end of the jacket.


WHT
RED
(RED)((GRY))

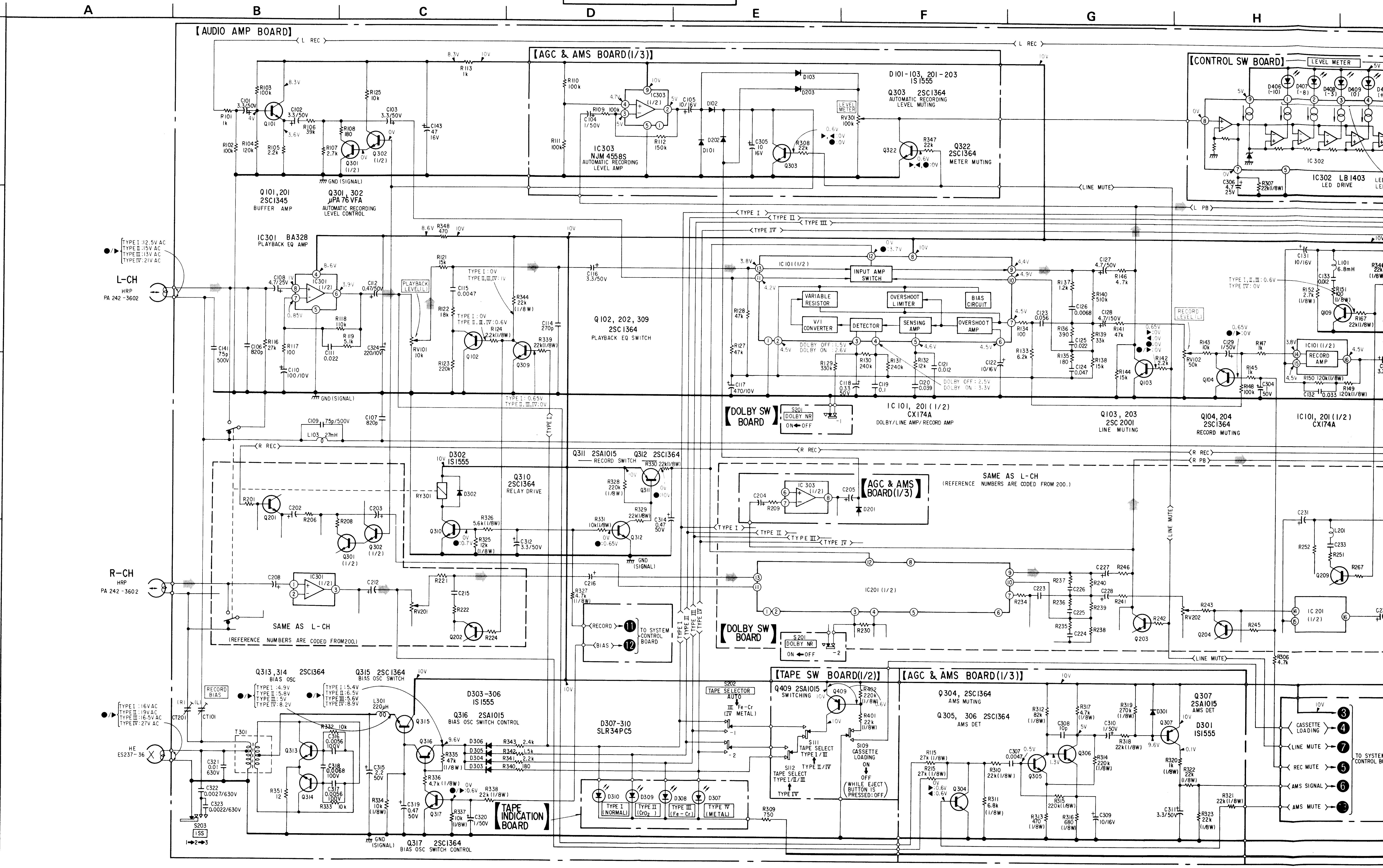
- ○— : parts extracted from the component side.
- ●— : parts extracted from the conductor side.
- ■ : part mounted on the conductor side.
- : B + pattern
- ━━➜━━ : signal path
- ━━ ━ ━➜ : L-CH signal path
- ━━ ▪▪ ━➜ : R-CH signal path

6-2. SCHEMATIC DIAGRAM
– AUDIO AMP SECTION –

- See page TC-80 for Notes.

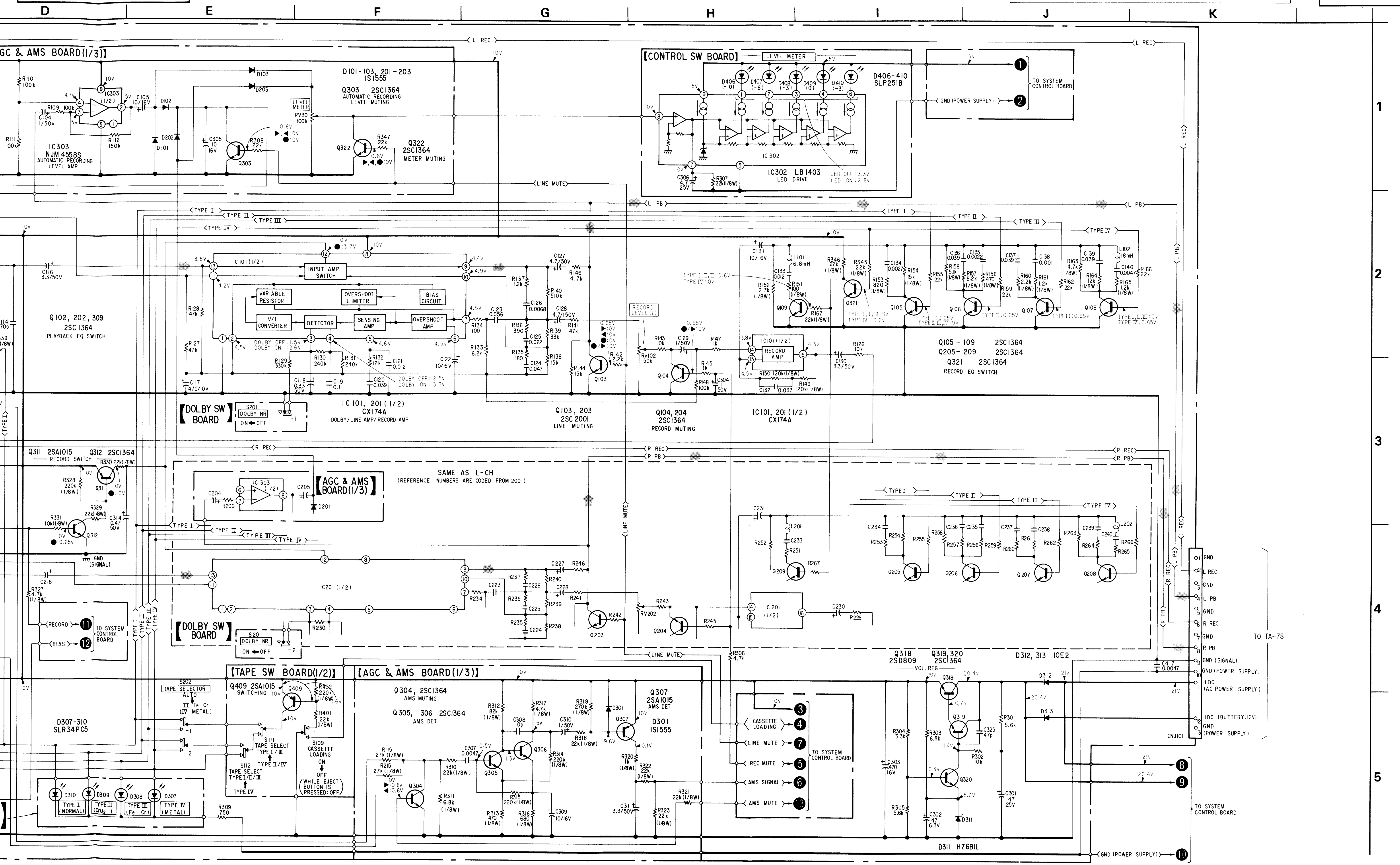
FH-7
TC-78

FH-7
TC-78

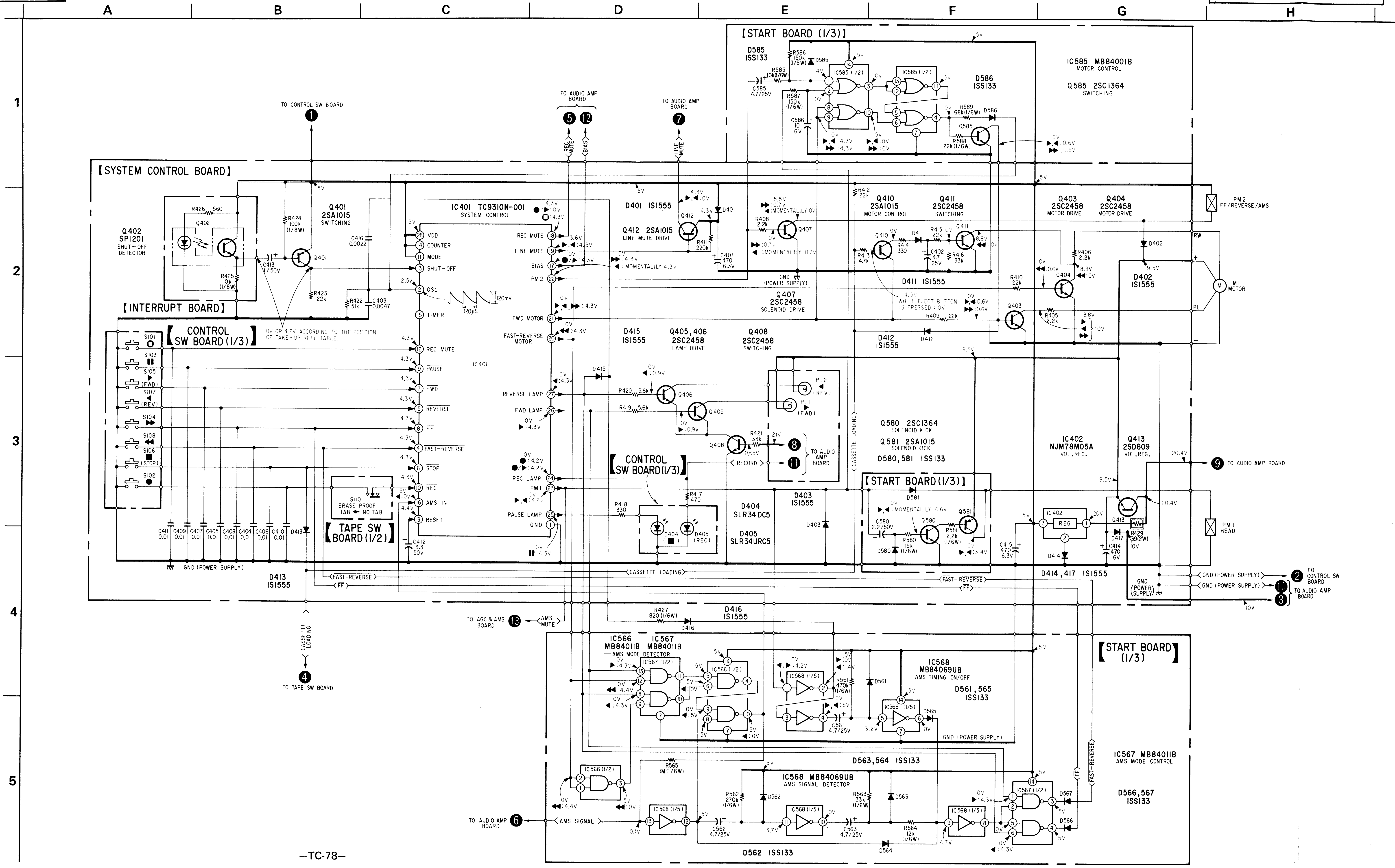


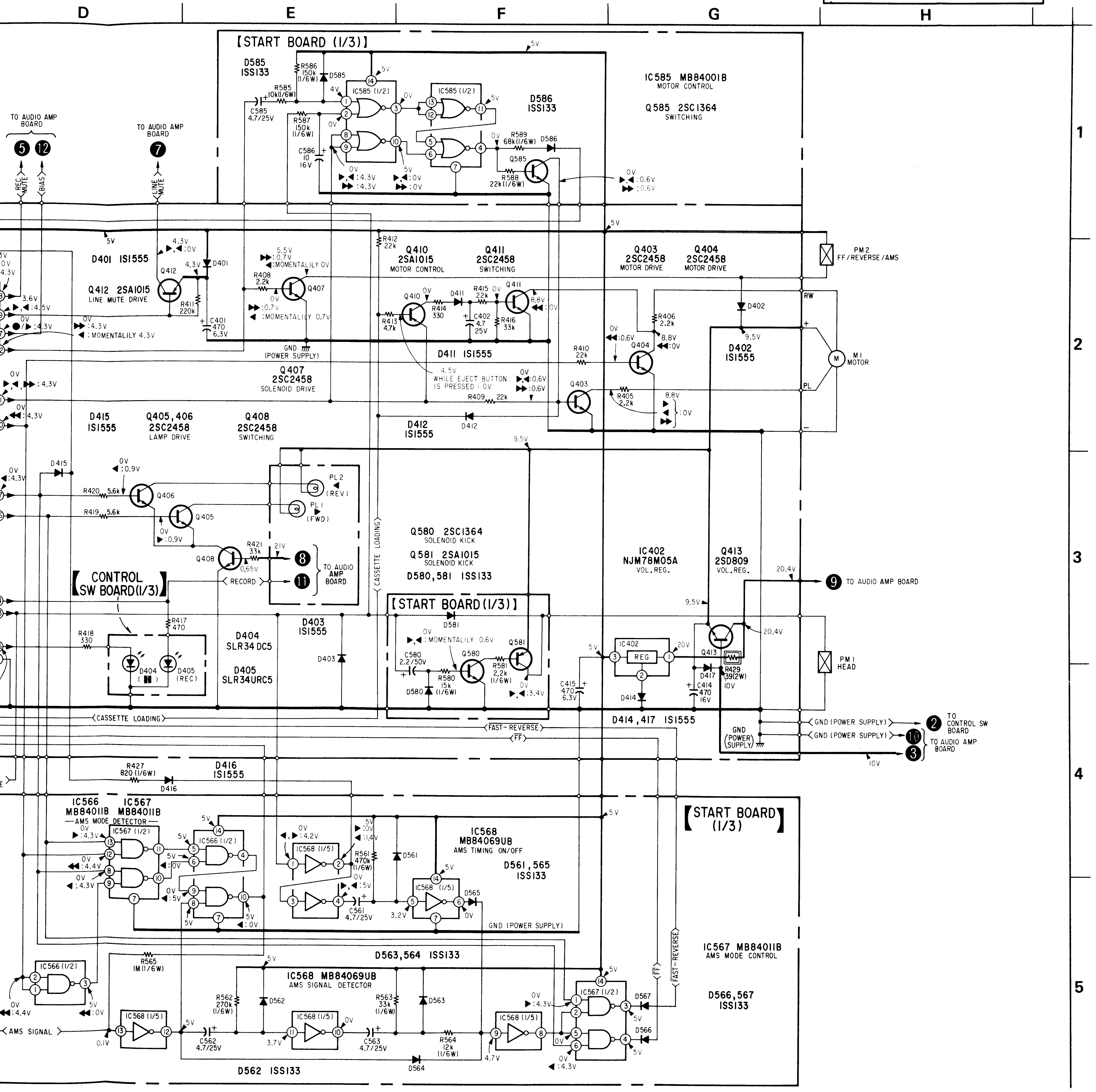
A
B
C
D
E
F
G
H
1
2
3
4
5
【AUDIO AMP BOARD】
L REC
【AGC & AMS BOARD(1/3)】
【CONTROL SW BOARD】
LEVEL METER
Q101,201
2SC1345
BUFFER AMP
Q301, 302
μPA76VFA
AUTOMATIC RECORDING LEVEL CONTROL
IC303
NJM 4558S
AUTOMATIC RECORDING LEVEL AMP
D101-103, 201-203
1S1555
Q303 2SC1364
AUTOMATIC RECORDING LEVEL MUTING
Q322
2SC1364
METER MUTING
IC302 LB1403
LED DRIVE
LINE MUTE
L PB
TYPE I
TYPE II
TYPE III
TYPE IV
IC301 BA328
PLAYBACK EQ AMP
L-CH
HRP
PA 242-3602
TYPE I: 12.5V AC
TYPE II: 15V AC
TYPE III: 13V AC
TYPE IV: 21V AC
PLAYBACK LEVEL(L)
Q102, 202, 309
2SC1364
PLAYBACK EQ SWITCH
IC101(1/2)
INPUT AMP SWITCH
VARIABLE RESISTOR
OVERSHOOT LIMITER
BIAS CIRCUIT
V/I CONVERTER
DETECTOR
SENSING AMP
OVERSHOOT AMP
DOLBY OFF: 1.5V
DOLBY ON: 2.6V
RECORD LEVEL(L)
IC101 (1/2)
RECORD AMP
【DOLBY SW BOARD】
S201
DOLBY NR
ON ← OFF
IC101, 201 (1/2)
CX174A
DOLBY/LINE AMP/RECORD AMP
Q103, 203
2SC2001
LINE MUTING
Q104, 204
2SC1364
RECORD MUTING
IC101, 201 (1/2)
CX174A
R REC
R PB
Q311 2SA1015
Q312 2SC1364
RECORD SWITCH
D302
1S1555
Q310
2SC1364
RELAY DRIVE
RY301
SAME AS L-CH
(REFERENCE NUMBERS ARE CODED FROM 200.)
【AGC & AMS BOARD(1/3)】
R-CH
HRP
PA 242-3602
IC201 (1/2)
SAME AS L-CH
(REFERENCE NUMBERS ARE CODED FROM200.)
RECORD ⑪
BIAS ⑫
TO SYSTEM CONTROL BOARD
【DOLBY SW BOARD】
S201
DOLBY NR
ON ← OFF
Q313, 314 2SC1364
BIAS OSC
Q315 2SC1364
BIAS OSC SWITCH
RECORD BIAS
TYPE I: 4.9V
TYPE II: 5.8V
TYPE III: 5V
TYPE IV: 8.2V
TYPE I: 5.4V
TYPE II: 6.5V
TYPE III: 5.6V
TYPE IV: 8.9V
TYPE I: 16V AC
TYPE II: 19V AC
TYPE III: 16.5V AC
TYPE IV: 27V AC
HE
ES237-36
T301
L301
220μH
D303-306
1S1555
Q316 2SA1015
BIAS OSC SWITCH CONTROL
D307-310
SLR34PC5
Q317 2SC1364
BIAS OSC SWITCH CONTROL
S203
ISS
1→2→3
【TAPE INDICATION BOARD】
D310 TYPE I (NORMAL)
D309 TYPE II (CrO2)
D308 TYPE III (Fe-Cr)
D307 TYPE IV (METAL)
S202
TAPE SELECTOR
AUTO
III Fe-Cr
IV METAL
【TAPE SW BOARD(1/2)】
Q409 2SA1015
SWITCHING
S111
TAPE SELECT
TYPE I/III
S112
TAPE SELECT
TYPE I/II/III
TYPE II/IV
TYPE IV
S109
CASSETTE LOADING
ON
OFF
(WHILE EJECT BUTTON IS PRESSED: OFF)
【AGC & AMS BOARD(1/3)】
Q304, 2SC1364
AMS MUTING
Q305, 306 2SC1364
AMS DET
Q307
2SA1015
AMS DET
D301
1S1555
③
CASSETTE LOADING ④
LINE MUTE ⑦
REC MUTE ⑤
AMS SIGNAL ⑥
AMS MUTE ⑬
TO SYSTEM CONTROL BOARD
GND (SIGNAL)

Note: Voltages are measured with a VOM (50kΩ/V).


D
E
F
G
H
I
J
K
1
2
3
4
5
AGC & AMS BOARD (1/3)
IC303 NJM 4558S AUTOMATIC RECORDING LEVEL AMP
D101-103, 201-203 1S1555
Q303 2SC1364 AUTOMATIC RECORDING LEVEL MUTING
Q322 2SC1364 METER MUTING
LEVEL METER
RV301 100k
CONTROL SW BOARD
D406-410 SLP251B
IC302 LB1403 LED DRIVE
LED OFF: 3.3V
LED ON: 2.8V
TO SYSTEM CONTROL BOARD
GND (POWER SUPPLY)
L REC
L PB
R REC
R PB
LINE MUTE
TYPE I
TYPE II
TYPE III
TYPE IV
IC101 (1/2)
INPUT AMP SWITCH
VARIABLE RESISTOR
OVERSHOOT LIMITER
BIAS CIRCUIT
V/I CONVERTER
DETECTOR
SENSING AMP
OVERSHOOT AMP
DOLBY OFF: 1.5V
DOLBY ON: 2.6V
DOLBY OFF: 2.5V
DOLBY ON: 3.3V
Q102, 202, 309 2SC1364 PLAYBACK EQ SWITCH
DOLBY SW BOARD
S201 DOLBY NR
ON ← OFF
IC101, 201 (1/2) CX174A DOLBY/LINE AMP/RECORD AMP
Q103, 203 2SC2001 LINE MUTING
Q104, 204 2SC1364 RECORD MUTING
IC101, 201 (1/2) CX174A
RECORD LEVEL (L)
RV102 50k
RECORD AMP
Q105-109 2SC1364
Q205-209 2SC1364
Q321 2SC1364
RECORD EQ SWITCH
TYPE I, II: 0.6V
TYPE IV: 0V
Q311 2SA1015 Q312 2SC1364 RECORD SWITCH
GND (SIGNAL)
SAME AS L-CH
(REFERENCE NUMBERS ARE CODED FROM 200.)
IC303 (1/2)
AGC & AMS BOARD (1/3)
IC201 (1/2)
RV202
TO SYSTEM CONTROL BOARD
RECORD
BIAS
S202 TAPE SELECTOR AUTO
III Fe-Cr
(IV METAL)
TAPE SW BOARD (1/2)
Q409 2SA1015 SWITCHING
S111 TAPE SELECT TYPE I/III
S112 TAPE SELECT TYPE I/II/III
TYPE II/IV
TYPE IV
S109 CASSETTE LOADING
ON
OFF
(WHILE EJECT BUTTON IS PRESSED: OFF)
D307-310 SLR34PC5
TYPE I (NORMAL)
TYPE II (CrO2)
TYPE III (Fe-Cr)
TYPE IV (METAL)
AGC & AMS BOARD (1/3)
Q304, 2SC1364 AMS MUTING
Q305, 306 2SC1364 AMS DET
Q307 2SA1015 AMS DET
D301 1S1555
CASSETTE LOADING
LINE MUTE
REC MUTE
AMS SIGNAL
AMS MUTE
Q318 2SD809
Q319, 320 2SC1364
VOL. REG
D312, 313 10E2
D311 HZ6BIL
CNJ101
GND
L REC
GND
L PB
GND
R REC
GND
R PB
GND (SIGNAL)
GND (POWER SUPPLY)
+DC (AC POWER SUPPLY)
+DC (BATTERY: 12V)
GND (POWER SUPPLY)
TO TA-78
TO SYSTEM CONTROL BOARD
GND (POWER SUPPLY)

SCHEMATIC DIAGRAM
– SYSTEM CONTROL SECTION –


A
B
C
D
E
F
G
H
1
2
3
4
5
【START BOARD (1/3)】
D585 ISS133
IC585 MB84001B MOTOR CONTROL
Q585 2SC1364 SWITCHING
D586 ISS133
R586 150k (1/6W)
R585 10k(1/6W)
C585 4.7/25V
R587 150k (1/6W)
C586 10 16V
R589 68k(1/6W)
R588 22k(1/6W)
IC585 (1/2)
TO CONTROL SW BOARD ❶
TO AUDIO AMP BOARD ❺ ⓬
TO AUDIO AMP BOARD ❼
REC MUTE
BIAS
LINE MUTE
【SYSTEM CONTROL BOARD】
Q402 SP1201 SHUT-OFF DETECTOR
Q401 2SA1015 SWITCHING
R426 560
R424 100k (1/8W)
R425 10k (1/8W)
C413 1/50V
R423 22k
C416 0.0022
R422 51k
C403 0.0047
【INTERRUPT BOARD】
0V OR 4.2V ACCORDING TO THE POSITION OF TAKE-UP REEL TABLE.
IC401 TC9310N-001 SYSTEM CONTROL
VDD
COUNTER
MODE
SHUT-OFF
OSC
TIMER
REC MUTE
PAUSE
FWD
REVERSE
FF
FAST-REVERSE
STOP
REC
AMS IN
RESET
REC MUTE
LINE MUTE
BIAS
PM2
FWD MOTOR
FAST-REVERSE MOTOR
REVERSE LAMP
FWD LAMP
REC LAMP
PM1
PAUSE LAMP
GND
120mV
120μS
【CONTROL SW BOARD (1/3)】
S101
S103
S105 (FWD)
S107 (REV)
S104
S108
S106 (STOP)
S102
S110 ERASE PROOF TAB ← NO TAB
【TAPE SW BOARD (1/2)】
C411 0.01
C409 0.01
C407 0.01
C405 0.01
C408 0.01
C404 0.01
C406 0.01
C410 0.01
D413
C412 3.3 50V
GND (POWER SUPPLY)
D413 IS1555
D401 IS1555
Q412 2SA1015 LINE MUTE DRIVE
R411 220k
C401 470 6.3V
R408 2.2k
Q407 2SC2458 SOLENOID DRIVE
GND (POWER SUPPLY)
:MOMENTALILY 0.7V
:MOMENTALILY 4.3V
D415 IS1555
Q405,406 2SC2458 LAMP DRIVE
Q408 2SC2458 SWITCHING
R420 5.6k
R419 5.6k
R421 33k
PL2 (REV)
PL1 (FWD)
TO AUDIO AMP BOARD ❽ ⓫
RECORD
【CONTROL SW BOARD(1/3)】
R418 330
R417 470
D404 SLR34DC5
D405 SLR34URC5
D403 IS1555
CASSETTE LOADING
R412 22k
Q410 2SA1015 MOTOR CONTROL
Q411 2SC2458 SWITCHING
R413 4.7k
R414 330
D411
R415 22k
C402 4.7 25V
R416 33k
D411 IS1555
4.5V WHILE EJECT BUTTON IS PRESSED : 0V
R409 22k
D412 IS1555
Q403 2SC2458 MOTOR DRIVE
Q404 2SC2458 MOTOR DRIVE
R406 2.2k
R410 22k
R405 2.2k
D402 IS1555
PM2 FF/REVERSE/AMS
M1 MOTOR
RW
PL
Q580 2SC1364 SOLENOID KICK
Q581 2SA1015 SOLENOID KICK
D580,581 ISS133
【START BOARD(1/3)】
D581
C580 2.2/50V
R580 15k (1/6W)
R581 2.2k (1/6W)
IC402 NJM78M05A VOL. REG.
Q413 2SD809 VOL. REG.
REG
C415 470 6.3V
D414
D417
C414 470 16V
R429 39(1/2W)
D414,417 IS1555
PM1 HEAD
20.4V
TO AUDIO AMP BOARD ❾
TO CONTROL SW BOARD ❷
TO AUDIO AMP BOARD ❿ ❸
GND (POWER SUPPLY)
GND (POWER SUPPLY)
FAST-REVERSE
FF
R427 820 (1/6W)
D416 IS1555
CASSETTE LOADING
TO TAPE SW BOARD ❹
TO AGC & AMS BOARD ⓭
AMS MUTE
IC566 MB84011B
IC567 MB84011B
AMS MODE DETECTOR
IC567 (1/2)
IC566 (1/2)
IC568 MB84069UB AMS TIMING ON/OFF
D561,565 ISS133
IC568 (1/5)
R561 470k (1/6W)
C561 4.7/25V
D561
D565
GND (POWER SUPPLY)
【START BOARD (1/3)】
R565 1M(1/6W)
D563,564 ISS133
IC568 MB84069UB AMS SIGNAL DETECTOR
R562 270k (1/6W)
D562
R563 33k (1/6W)
D563
C562 4.7/25V
C563 4.7/25V
R564 12k (1/6W)
D564
D562 ISS133
IC567 MB84011B AMS MODE CONTROL
D566,567 ISS133
D567
D566
TO AUDIO AMP BOARD ❻
AMS SIGNAL



D
E
F
G
H
1
2
3
4
5
[START BOARD (1/3)]
D585 1SS133
IC585 MB84001B MOTOR CONTROL
Q585 2SC1364 SWITCHING
D586 1SS133
TO AUDIO AMP BOARD
TO AUDIO AMP BOARD
REC MUTE
BIAS
LINE MUTE
D401 1S1555
Q412 2SA1015 LINE MUTE DRIVE
Q410 2SA1015 MOTOR CONTROL
Q411 2SC2458 SWITCHING
Q403 2SC2458 MOTOR DRIVE
Q404 2SC2458 MOTOR DRIVE
PM2 FF/REVERSE/AMS
D402
D402 1S1555
M1 MOTOR
GND (POWER SUPPLY)
Q407 2SC2458 SOLENOID DRIVE
D411 1S1555
WHILE EJECT BUTTON IS PRESSED : 0V
D415 1S1555
Q405,406 2SC2458 LAMP DRIVE
Q408 2SC2458 SWITCHING
D412 1S1555
PL2 (REV)
PL1 (FWD)
Q580 2SC1364 SOLENOID KICK
Q581 2SA1015 SOLENOID KICK
D580,581 1SS133
IC402 NJM78M05A VOL.REG.
Q413 2SD809 VOL.REG.
TO AUDIO AMP BOARD
CASSETTE LOADING
CONTROL SW BOARD (1/3)
RECORD
D404 SLR34DC5
D405 SLR34URC5
D403 1S1555
[START BOARD (1/3)]
PM1 HEAD
D414,417 1S1555
GND (POWER SUPPLY)
TO CONTROL SW BOARD
TO AUDIO AMP BOARD
CASSETTE LOADING
FAST-REVERSE
FF
D416 1S1555
IC566 MB84011B
IC567 MB84011B
AMS MODE DETECTOR
IC568 MB84069UB AMS TIMING ON/OFF
D561,565 1SS133
[START BOARD (1/3)]
D563,564 1SS133
IC568 MB84069UB AMS SIGNAL DETECTOR
IC567 MB84011B AMS MODE CONTROL
D566,567 1SS133
AMS SIGNAL
D562 1SS133

NOTE FOR SCHEMATIC DIAGRAM
– Audio Amp Section –

Note:

- Components for right channel have same values as for left channel. Reference numbers are coded from 200.
- All capacitors are in μF unless otherwise noted. pF : μμF 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in ohms, ¼W unless otherwise noted. kΩ : 1000Ω, MΩ : 1000kΩ
- ☐ : adjustment for repair.
- Readings are taken under no-signal conditions.

No mark: STOP
▶ : FWD
◀ : REV
▶▶ : FF
◀◀ : FAST-REVERSE
● : REC
●/▶ : REC/FWD
O : REC MUTE
▮▮ : PAUSE

- ⇨ : signal path

- Switch

Ref. No.	Switch	Position
S109	CASSETTE LOADING	ON
S111	TAPE SELECTOR	TYPE II/IV
S112	TAPE SELECTOR	TYPE IV
S201	DOLBY NR	OFF
S202	TAPE SELECTOR	AUTO
S203	ISS	1

– System Control Section –

Note:

- All capacitors are in μF unless otherwise noted. pF : μμF 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in ohms, ¼W unless otherwise noted. kΩ : 1000Ω, MΩ : 1000kΩ
- Readings are taken under no-signal conditions.

No mark: STOP
▶ : FWD
◀ : REV
▶▶ : FF
◀◀ : FAST-REVERSE
● : REC
●/▶ : REC/FWD
O : REC MUTE
▮▮ : PAUSE

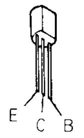
- Switch

Ref. No.	Switch	Position
S101	O (REC MUTE)	OFF
S102	● (REC)	OFF
S103	▮▮ (PAUSE)	OFF
S104	▶▶ (FF)	OFF
S105	▶ (FWD)	OFF
S106	■ (STOP)	OFF
S107	◀ (REV)	OFF
S108	◀◀ (FAST-REVERSE)	OFF
S110	ACCIDENTAL-ERASURE PREVENTION	NO TAB

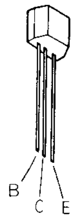
Note: Voltages are measured with a VOM (50kΩ/V).

SEMICONDUCTOR LEAD LAYOUTS

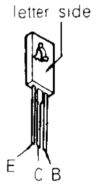
2SA1015
2SC945
2SC1345
2SC1364
2SC2001



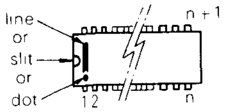
2SC2458



2SD809

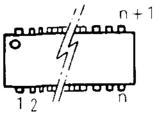

letter side
E
C B

CX174A
MB84069UB
TC9310N-001
μPD4011C


line
or
slit
or
dot
n + 1
1 2
n

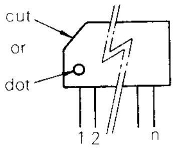
(Top view)

MB84001B
MB84011B

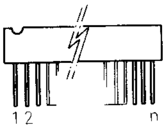


(Top view)

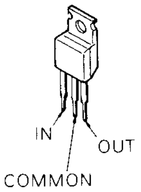
LB1403
NJM4558S


cut
or
dot
1 2
n

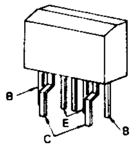
BA328



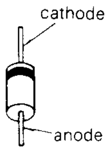
NJM78M05A


IN
OUT
COMMON

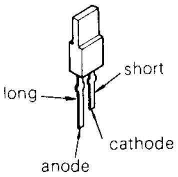
μPA76V-FA



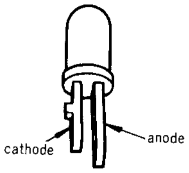
10E2
1S1555
1SS133
HZ6B1L


cathode
anode

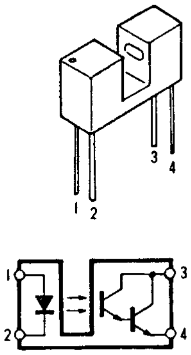
SLP251B


short
long
cathode
anode

SLR34DC5
SLR34PC5
SLR34URC5

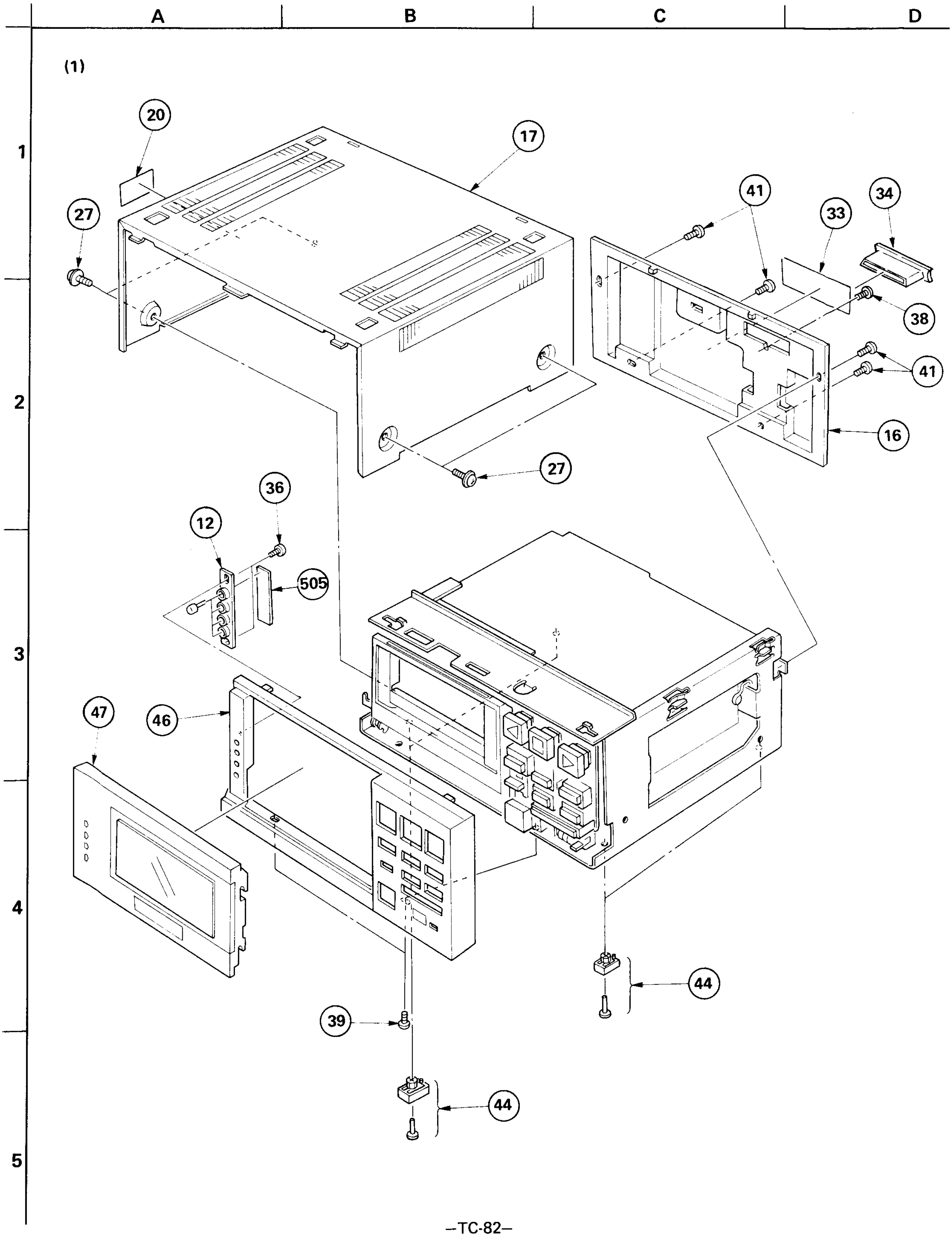

cathode
anode

SPI201

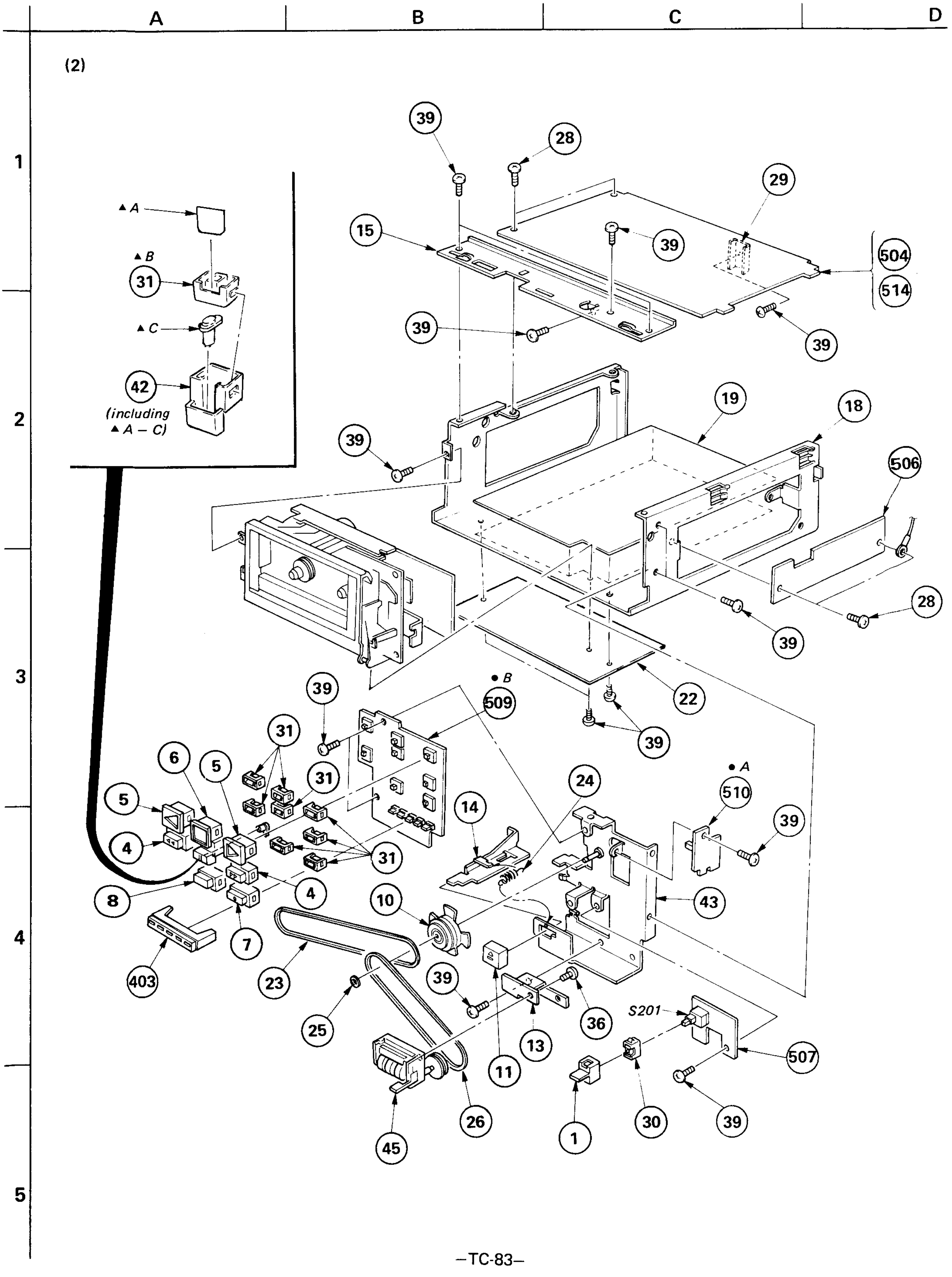


SECTION 7
EXPLODED VIEWS AND PARTS LIST

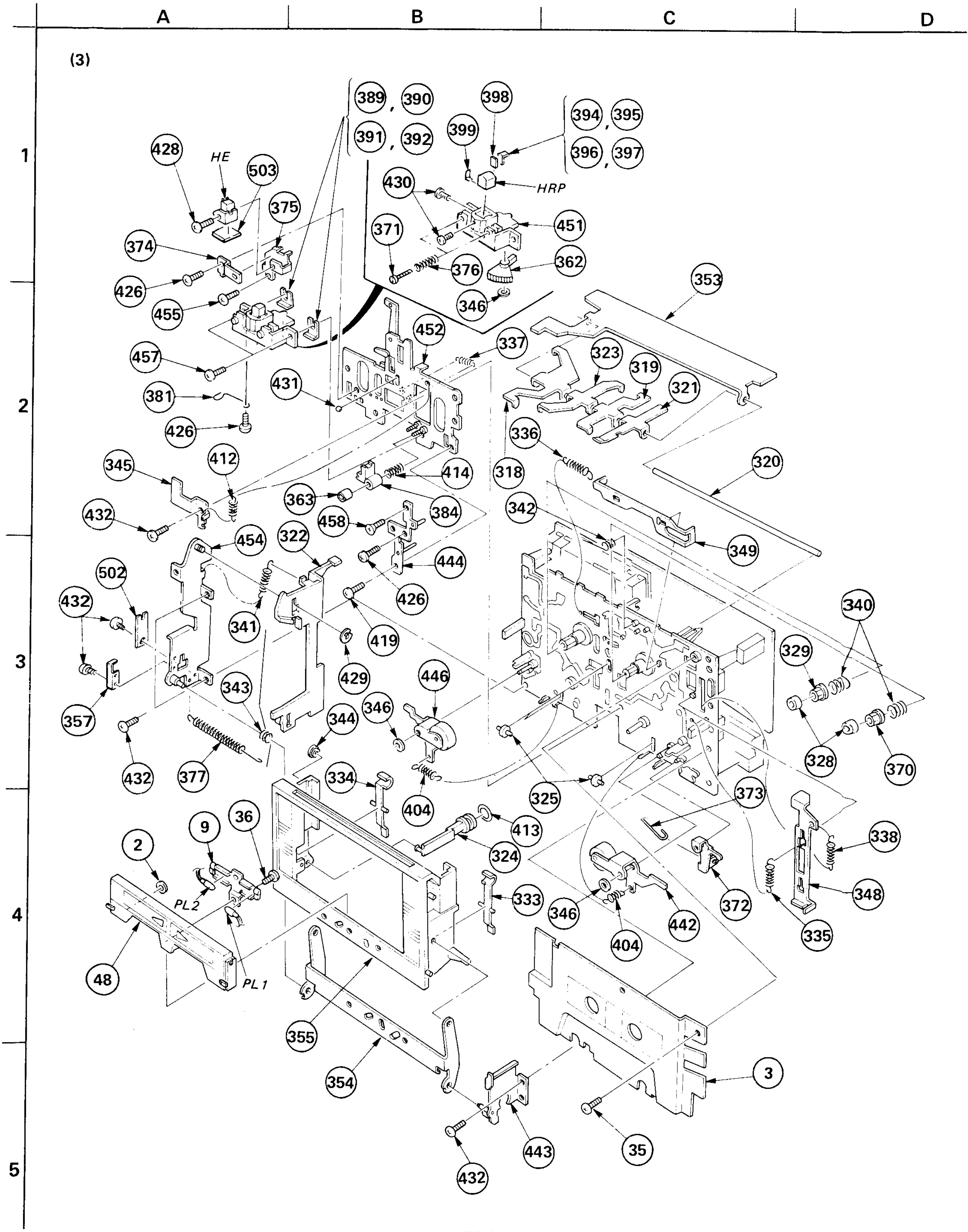
7-1. EXPLODED VIEWS

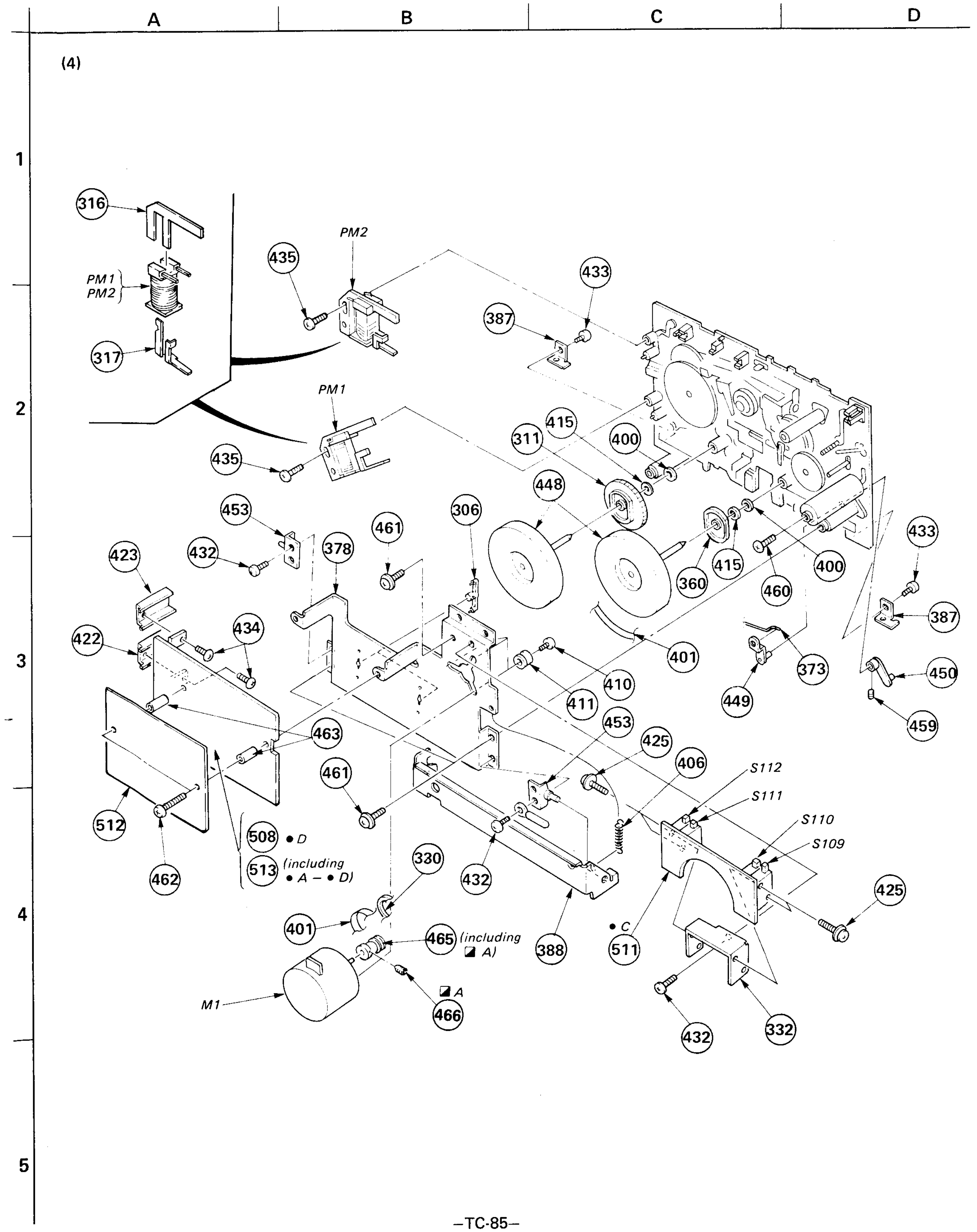

A
B
C
D
1
2
3
4
5
(1)
20
17
27
41
34
33
38
41
16
27
36
12
505
47
46
44
39
44

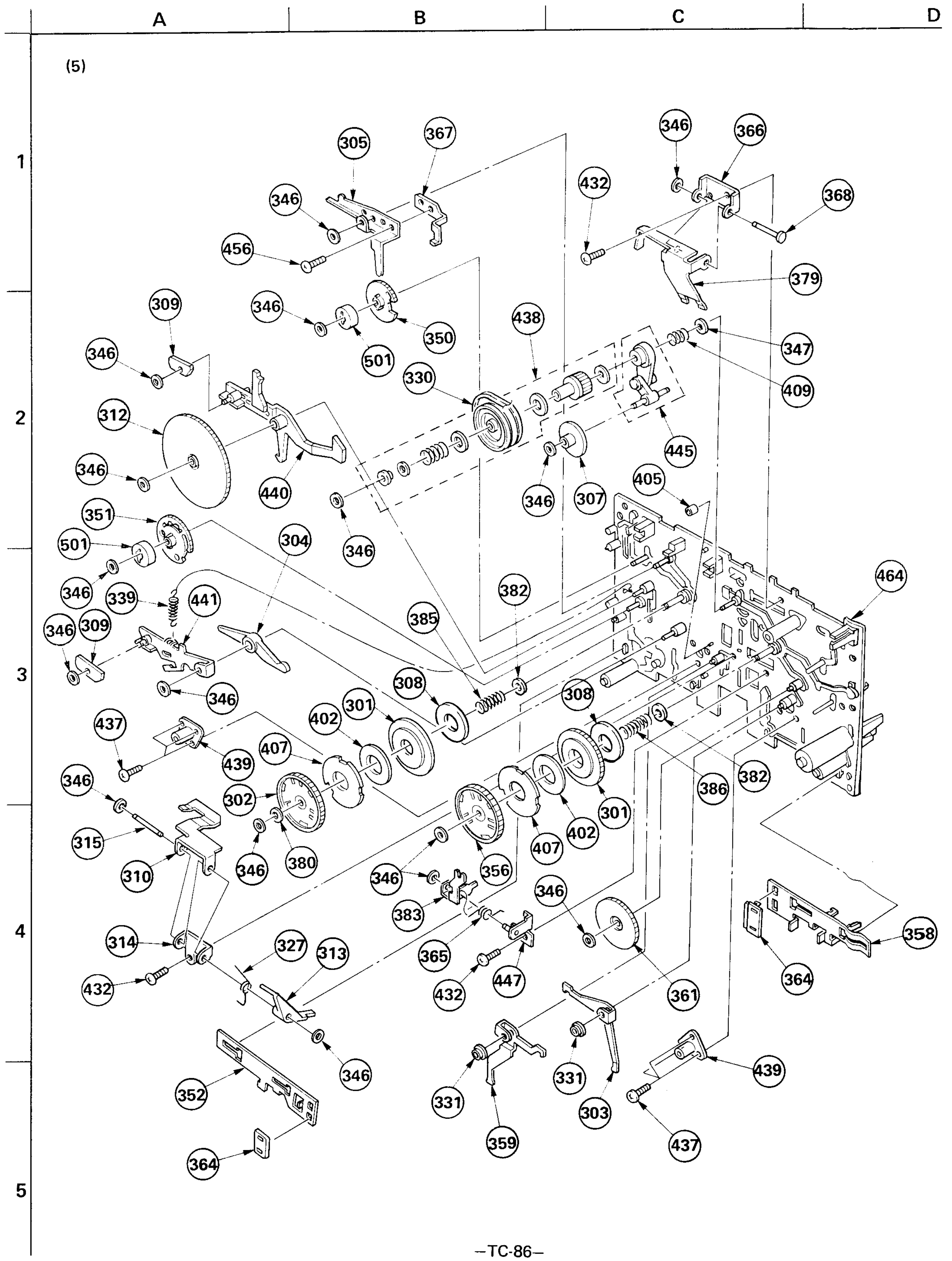
(2)


A
B
C
D
▲A
▲B
▲C
(including ▲A – C)
●B
●A
S201

(3)


A
B
C
D
389, 390
391, 392
394, 395
396, 397
HRP
HE
PL2
PL1


A
B
C
D
(4)
PM1
PM2
PM2
PM1
S112
S111
S110
S109
508 ● D
513 (including ● A – ● D)
465 (including ◪ A)
● C
M1
◪ A


A
B
C
D
(5)

7-2. PARTS LIST

GENERAL SECTION

No.	Part No.	Description
1	3-302-902-00	KNOB, PUSH
2	3-307-390-00	BUSHING, LOADING SPRING
3	3-309-101-00	PLATE (A), ORNAMENTAL, MD
4	3-309-102-00	BUTTON, REW-FF
5	3-309-106-00	BUTTON, REV-FWD
6	3-309-107-00	BUTTON, STOP
7	3-309-111-00	BUTTON, REC
8	3-309-113-00	BUTTON, REC MUTE
9	3-309-115-00	HOLDER, LAMP
10	3-309-116-00	PULLEY, MIDWAY
11	3-309-117-00	BUTTON, EJECT
12	3-309-118-00	HOLDER, TS-LED
13	♠;3-309-119-00	BRACKET, COUNTER
14	♠;3-309-120-00	SLIDER, EJECT
15	♠;3-309-128-00	JOINT
16	3-309-129-00	PLATE, JACK
17	3-309-130-00	CASE
18	♠;3-309-132-00	CHASSIS
19	♠;3-309-133-00	PLATE, SHIELD
20	3-309-134-00	LABEL, MODEL NUMBER (W)
21	....	
22	♠;3-309-137-00	PLATE, SHIELD
23	3-530-181-XX	BELT, COUNTER
24	♠;3-542-475-00	SPRING, TENSION
25	3-558-708-01	WASHER, STOPPER
26	3-533-363-00	BELT (A), COUNTER
27	3-703-354-11	SCREW (OS), CASE, CLAW
28	3-703-486-00	+PTTWH 3X5
29	♠;4-861-002-11	HEAT SINK
30	4-864-307-00	RING
31	4-881-725-00	RING (TACT), FLEXIBLE
32	....	
33	4-884-865-00	(AEP,UK)...LABEL, MODEL NUMBER (AEP/UK)
33	4-884-866-00	(E)........LABEL, MODEL NUMBER (E1/E2)
34	4-884-874-00	COVER, CONNECTOR (A)
35	7-685-104-19	SCREW +P 2X6 TYPE2 NON-SLIT
36	7-685-533-19	SCREW +BTP 2.6X6 TYPE2 N-S
37	....	
38	7-685-547-19	SCREW +BTP 3X10 TYPE2 N-S
39	7-685-871-01	SCREW +BVTT 3X6 (S)
40	....	
41	7-685-871-09	SCREW +BVTT 3X6 (S)
42	A-2325-013-A	BUTTON ASSY, PAUSE
43	♠;X-3309-101-0	CHASSIS ASSY, AMPLIFIER
44	X-4884-801-0	FOOT ASSY, RUBBER
45	1-548-563-31	COUNTER, TAPE

GENERAL SECTION

No.	Part No.	Description
46	X-3309-103-0	PANEL ASSY, FRONT
47	X-3309-104-0	LID ASSY, CASSETTE
48	X-3309-102-0	PLATE ASSY, ORNAMENTAL, HEAD

MECHANISM SECTION

No.	Part No.	Description
301	3-307-302-00	MAGNET, REEL TABLE
302	3-307-305-02	GEAR (T), REEL
303	♠;3-307-306-00	LEVER, SELECT, REVERSE
304	3-307-307-00	LEVER, FWD
305	♠;3-307-308-00	LEVER, FF
306	3-307-309-00	RETAINER (A), THRUST
307	3-307-312-00	GEAR, FR
308	3-307-313-00	PLATE, YOKE
309	3-307-315-00	ARBOR, MOVABLE
310	3-307-319-00	RETAINER, TAKE-UP GEAR
311	3-307-320-00	GEAR (T), PINION
312	3-307-321-00	GEAR (T), DRIVING
313	3-307-328-00	LEVER, TAKE-UP SELECTION
314	♠;3-307-329-00	PLATE, FULCRUM,SELECTION LEVER
315	3-307-330-00	PIN, FULCRUM PLATE
316	3-307-332-00	ARBOR, FIXED
317	3-307-333-00	ARBOR, TRIGGER
318	♠;3-307-337-00	LEVER, REC DETECTION
319	♠;3-307-338-00	LEVER, METAL DETECTION
320	♠;3-307-339-00	SHAFT, DETECTION LEVER
321	♠;3-307-344-00	LEVER, HALF RETAINER
322	3-307-345-00	SLIDER, EJECT
323	♠;3-307-346-00	LEVER, DETECTION
324	3-307-347-00	PISTON
325	3-307-348-00	ROLLER
326	....	
327	3-307-355-00	SPRING
328	3-307-362-00	CAP, REEL
329	3-307-363-00	CLAW (N), REEL
330	3-307-366-00	BELT, FAST FORWARD

NOTE:

- Items with no part number and no description are not stocked because they are seldom required for routine service.
- Items marked " ♠ " are not stocked since thev are seldom required for routine service. Some delay should be anticipated when ordering these items.
- Due to standardization, parts with part numbers (Δ-ΔΔΔ-ΔΔΔ-XX or Δ-ΔΔΔΔ-ΔΔΔ-X) may be different from those used in the set.

CAPACITORS:

- All capacitors are in μF. Common capacitors are omitted. Refer to the following lists for their part numbers. MF:μF, PF:μμF.

RESISTORS

- All resistors are in ohms. Common 1/4W, 1/8W and 1/16W carbon resistors are omitted. Refer to the following lists for their part numbers.
- F : nonflammable

COILS

- MMH : mH, UH : μH

SEMICONDUCTORS

In each case, U : μ, for example:
UA···: μA···, UPA···: μPA···, UPC···: μPC,
UPD···: μPD···

MECHANISM SECTION

No.	Part No.	Description
331	3-307-367-00	BUSHING, SELECT LEVER
332	♠;3-307-370-00	BRACKET, SWITCH
333	3-307-371-00	SPRING (LEFT)
334	3-307-372-00	SPRING (RIGHT)
335	3-307-373-00	SPRING, TENSION
336	3-307-374-00	SPRING, TENSION
337	3-307-375-00	SPRING, TENSION
338	3-307-377-00	SPRING, TENSION
339	3-307-378-00	SPRING, TENSION
340	3-307-380-00	SPRING, COMPRESSION
341	3-307-381-00	SPRING, TENSION
342	3-307-382-00	SPRING
343	3-307-383-00	SPRING
344	3-307-390-00	BUSHING, LOADING SPRING
345	3-307-391-00	SPRING
346	3-307-394-00	RETAINER (B), THRUST
347	3-307-395-00	RETAINER, SPRING
348	3-307-397-00	SLIDER, PAUSE
349	♠;3-307-399-00	SLIDER, MODE
350	3-307-401-00	GEAR, FF CAM
351	3-307-402-00	GEAR, FWD CAM
352	♠;3-307-403-00	SLIDER, FWD
353	♠;3-307-404-00	RETAINER, DETECTION SWITCH
354	♠;3-307-405-00	PLATE, FULCRUM, CASSETTE HOLDER
355	3-307-407-00	HOLDER, CASSETTE
356	3-307-412-00	GEAR, TAKE-UP REEL
357	3-307-416-00	STOPPER, LOADING
358	♠;3-307-420-00	SLIDER, REVERSE
359	♠;3-307-421-00	LEVER (R), FWD SELECTION
360	3-307-422-00	GEAR (S), PINION
361	3-307-423-00	GEAR (S), DRIVING
362	3-307-427-00	GEAR, HEAD, ROTARY
363	3-307-435-00	NUT, ADJUSTMENT, TAPE GUIDE
364	♠;3-307-437-00	BLOCK, HEAD SELECTION
365	3-307-441-00	SPRING
366	♠;3-307-443-00	BRACKET, RETAINER, SUPPLY GEAR
367	♠;3-307-444-00	LEVER, FF ASSIST
368	♠;3-307-445-00	SHAFT, RETAINER, SUPPLY GEAR
369	....	
370	3-307-447-00	CLAW (R), REEL
371	3-307-448-00	SCREW, ADJUSTMENT, AZIMUTH
372	♠;3-307-449-00	LEVER (R), PAUSE
373	♠;3-307-450-00	ROD, PULL, PAUSE
374	3-307-457-00	SPRING
375	3-307-458-00	PLATE (L), ADJUSTMENT, HEAD

MECHANISM SECTION

No.	Part No.	Description
376	3-307-460-00	SPRING, COMPRESSION
377	3-307-461-00	SPRING, TENSION
378	♠;3-307-462-00	RETAINER (R), THRUST
379	♠;3-307-464-00	RETAINER, SUPPLY GEAR
380	3-307-465-00	RETAINER, TAKE-UP
381	♠;3-307-466-00	CLAMP
382	♠;3-307-467-00	RETAINER, SPRING
383	3-307-469-00	LEVER, SELECTION, SUPPLY
384	3-307-470-00	GUIDE (L), TAPE
385	3-307-471-00	SPRING, COMPRESSION
386	3-307-471-11	SPRING, COMPRESSION
387	♠;3-307-472-00	BRACKET, MD
388	♠;3-307-474-00	LEVER (R2), EJECT
389	3-307-477-01	SEAM (A), HEAD ADJUSTMENT (t=0.1)
390	3-307-477-11	SEAM (A), HEAD ADJUSTMENT (t=0.2)
391	3-307-477-21	SEAM (A), HEAD ADJUSTMENT (t=0.3)
392	3-307-477-31	SEAM (A), HEAD ADJUSTMENT (t=0.4)
393	....	
394	3-307-479-01	SEAM (B), HEAD ADJUSTMENT (t=0.1)
395	3-307-479-11	SEAM (B), HEAD ADJUSTMENT (t=0.2)
396	3-307-479-21	SEAM (B), HEAD ADJUSTMENT (t=0.3)
397	3-307-479-31	SEAM (B), HEAD ADJUSTMENT (t=0.4)
398	3-307-480-00	SEAM, HEAD (t=0.05)
399	3-307-481-00	BASE, HEAD
400	3-307-482-00	WASHER, LUMILER
401	3-307-483-00	BELT (R), CAPSTAN
402	3-307-958-00	WASHER, POLYETHYLENE
403	3-309-105-00	HOLDER, REC-LED
404	3-527-189-00	SPRING, TENSION
405	3-538-051-00	RUBBER, BRAKE
406	3-578-393-00	SPRING, TENSION
407	3-561-827-00	PLATE (A), HYSTERESIS
408	....	
409	3-566-903-00	SPRING
410	3-570-027-00	SCREW, MOTOR
411	3-570-118-00	CUSHION, MOTOR
412	3-570-914-00	SPRING, TENSION
413	3-575-392-00	RING, PISTON
414	3-644-718-00	SPRING, COMPRESSION
415	3-701-438-11	WASHER, 2.5
416	....	
417	....	
418	....	
419	3-701-467-00	SCREW, LOCK
420	....	

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- All resistors are in ohms. Common 1/4W, 1/8W and 1/16W carbon resistors are omitted. Refer to the following lists for their part numbers.
- F : nonflammable

COILS

- MMH : mH, UH : μH

SEMICONDUCTORS

In each case, U : μ, for example:
UA···: μA···, UPA···: μPA···, UPC···: μPC,
UPD···: μPD···

MECHANISM SECTION

No.	Part No.	Description
421	....	
422	♠;4-861-002-11	HEAT SINK
423	♠;4-866-647-00	HEAT SINK
424	....	
425	7-621-760-05	+PSW, 2.6X16
426	7-621-772-00	SCREW +B 2X3
427	....	
428	7-621-772-40	SCREW +B 2X8
429	7-624-105-04	STOP RING 2.3, TYPE -E
430	7-627-552-07	SCREW, PRECISION +P 1.7X2.5
431	7-671-111-11	STEEL, BOUL 1.5MM
432	7-685-860-01	SCREW +BVTT 2.6X4 (S)
433	7-685-870-01	SCREW +BVTT 3X5 (S)
434	7-685-871-01	SCREW +BVTT 3X6 (S)
435	7-687-204-21	TOTSU PTPWH 2X6 NON-SLIT, TYPE2
436	....	
437	7-687-701-39	SCREW, TOTSU BTT 2.6X4
438	A-2142-022-A	PULLEY ASSY, FR
439	X-3307-303-0	BEARING ASSY, CAPSTAN
440	X-3307-304-0	LEVER ASSY, FF LOCK
441	♠;X-3307-305-0	LEVER ASSY, FWD LOCK
442	X-3307-307-0	PINCH ROLLER (N) ASSY
443	♠;X-3307-310-0	PLATE (RIGHT) ASSY, SIDE
444	X-3307-311-2	PLATE ASSY (AMS), ADJUSTMENT
445	X-3307-312-0	LEVER ASSY, FR
446	X-3307-316-0	PINCH ROLLER (R) ASSY
447	♠;X-3307-317-0	PLATE ASSY, FULCRUM, LEVER
448	X-3307-318-0	FLYWHEEL (R)-1 ASSY
449	♠;X-3307-319-0	ARM (A) ASSY, PAUSE
450	♠;X-3307-320-0	ARM (B) ASSY, PAUSE
451	X-3307-321-2	HOLDER ASSY, HEAD
452	X-3307-323-0	CHASSIS (R) ASSY, HEAD
453	♠;X-3307-326-0	PLATE (R2) ASSY, FULCRUM, EJECT
454	♠;X-3307-327-0	PLATE (L2) ASSY, SIDE
455	7-621-255-20	SCREW +P2X4
456	7-621-259-15	SCREW +P2.6X3
457	7-621-259-35	SCREW +P2.6X5
458	7-621-555-30	SCREW +K2X5
459	7-621-731-08	SET SCREW 2X2.5
460	7-685-864-01	SCREW +BVTT 2.6X4
461	7-687-246-21	SCREW, TOTSU, PTPWH 3X8, TYPE2
462	7-685-876-01	SCREW +BVTT 3X16
463	♠;3-002-407-11	COLLAR
464	♠;X-3307-331-1	CHASSIS ASSY, MECHANISM
465	X-3307-329-0	PULLEY (R) ASSY, MOTOR
466	7-621-732-08	SET SCREW 2X3

ELECTRICAL PARTS

Ref.No.	Part No.	Description			
501	1-452-202-00	MAGNET			
502	♠;1-608-170-00	PC BOARD, HEAD TRANSLATION			
503	♠;1-608-268-00	PC BOARD, ERASE HEAD			
504	♠;1-608-387-00	PC BOARD, AUDIO AMP			
505	♠;1-608-388-00	PC BOARD, TAPE INDICATION			
506	♠;1-608-389-00	PC BOARD, AGC & AMS			
507	♠;1-608-390-00	PC BOARD, DOLBY SW			
508	♠;1-608-391-00	PC BOARD, SYSTEM CONTROL			
509	♠;1-608-392-00	PC BOARD, CONTROL SW			
510	♠;1-608-393-00	PC BOARD, INTERRUPT			
511	♠;1-608-394-00	PC BOARD, TAPE SW			
512	♠;1-608-732-00	PC BOARD, START			
513	♠;A-2019-148-A	MOUNTED PCB, SYSTEM CONTROL			
514	♠;A-2056-173-A	MOUNTED PCB, AUDIO AMP			
C101	1-123-354-00	ELECT	3.3MF	20%	50V
C102	1-123-354-00	ELECT	3.3MF	20%	50V
C103	1-123-354-00	ELECT	3.3MF	20%	50V
C104	1-123-380-00	ELECT	1MF	20%	50V
C105	1-123-356-00	ELECT	10MF	20%	16V
C106	1-161-322-00	CERAMIC	820PF	10%	50V
C107	1-161-322-00	CERAMIC	820PF	10%	50V
C108	1-123-369-00	ELECT	4.7MF	20%	25V
C109	1-107-167-00	MICA	75PF	5%	500V
C110	1-123-307-00	ELECT	100MF	20%	10V
C111	1-130-624-00	FILM	0.022MF	5%	50V
C112	1-123-351-00	ELECT	0.47MF	20%	50V
C114	1-161-316-00	CERAMIC	270PF	10%	50V
C115	1-161-377-00	CERAMIC	0.0047MF	20%	50V
C116	1-123-354-00	ELECT	3.3MF	20%	50V
C117	1-123-310-00	ELECT	470MF	20%	10V
C118	1-123-286-00	ELECT	0.33MF	20%	50V
C119	1-130-632-00	FILM	0.1MF	5%	50V
C120	1-130-627-00	FILM	0.039MF	5%	50V
C121	1-130-621-00	FILM	0.012MF	5%	50V
C122	1-123-356-00	ELECT	10MF	20%	16V
C123	1-130-629-00	FILM	0.056MF	5%	50V
C124	1-130-628-00	FILM	0.047MF	5%	50V
C125	1-130-624-00	FILM	0.022MF	5%	50V
C126	1-108-575-00	MYLAR	0.0068MF	5%	50V
C127	1-123-369-00	ELECT	4.7MF	20%	50V
C128	1-123-369-00	ELECT	4.7MF	20%	50V
C129	1-123-380-00	ELECT	1MF	20%	50V
C130	1-123-354-00	ELECT	3.3MF	20%	50V
C131	1-123-356-00	ELECT	10MF	20%	16V

NOTE:
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- Items marked " ♠ " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- Due to standardization, parts with part numbers (Δ-ΔΔΔ-ΔΔΔ-XX or Δ-ΔΔΔΔ-ΔΔΔ-X) may be different from those used in the set.

CAPACITORS:
- All capacitors are in μF. Common capacitors are omitted. Refer to the following lists for their part numbers. MF:μF, PF:μμF.

RESISTORS
- All resistors are in ohms. Common 1/4W, 1/8W and 1/16W carbon resistors are omitted. Refer to the following lists for their part numbers.
- F : nonflammable

COILS
- MMH : mH, UH : μH

SEMICONDUCTORS
In each case, U : μ, for example:
UA···: μA···, UPA···: μPA···, UPC···: μPC,
UPD···: μPD···

ELECTRICAL PARTS

Ref.No.	Part No.	Description			
C132	1-130-626-00	FILM	0.033MF	5%	50V
C133	1-130-621-00	FILM	0.012MF	5%	50V
C134	1-108-565-00	MYLAR	0.0027MF	5%	50V
C135	1-108-563-00	MYLAR	0.0022MF	5%	50V
C136	1-130-627-00	FILM	0.039MF	5%	50V
C137	1-130-627-00	FILM	0.039MF	5%	50V
C138	1-108-555-00	MYLAR	0.001MF	5%	50V
C139	1-130-627-00	FILM	0.039MF	5%	50V
C140	1-108-571-00	MYLAR	0.0047MF	5%	50V
C141	1-107-167-00	MICA	75PF	5%	500V
C143	1-123-319-00	ELECT	47MF	20%	16V
C201	1-123-354-00	ELECT	3.3MF	20%	50V
C202	1-123-354-00	ELECT	3.3MF	20%	50V
C203	1-123-354-00	ELECT	3.3MF	20%	50V
C204	1-123-380-00	ELECT	1MF	20%	50V
C205	1-123-356-00	ELECT	10MF	20%	16V
C206	1-161-322-00	CERAMIC	820PF	10%	50V
C207	1-161-322-00	CERAMIC	820PF	10%	50V
C208	1-123-369-00	ELECT	4.7MF	20%	25V
C209	1-107-167-00	MICA	75PF	5%	500V
C210	1-123-307-00	ELECT	100MF	20%	10V
C211	1-130-624-00	FILM	0.022MF	5%	50V
C212	1-123-351-00	ELECT	0.47MF	20%	50V
C214	1-161-316-00	CERAMIC	270PF	10%	50V
C215	1-161-377-00	CERAMIC	0.0047MF	20%	50V
C216	1-123-354-00	ELECT	3.3MF	20%	50V
C217	1-123-310-00	ELECT	470MF	20%	10V
C218	1-123-286-00	ELECT	0.33MF	20%	50V
C219	1-130-632-00	FILM	0.1MF	5%	50V
C220	1-130-627-00	FILM	0.039MF	5%	50V
C221	1-130-621-00	FILM	0.012MF	5%	50V
C222	1-123-356-00	ELECT	10MF	20%	16V
C223	1-130-629-00	FILM	0.056MF	5%	50V
C224	1-130-628-00	FILM	0.047MF	5%	50V
C225	1-130-624-00	FILM	0.022MF	5%	50V
C226	1-108-575-00	MYLAR	0.0068MF	5%	50V
C227	1-123-369-00	ELECT	4.7MF	20%	50V
C228	1-123-369-00	ELECT	4.7MF	20%	50V
C229	1-123-380-00	ELECT	1MF	20%	50V
C230	1-123-354-00	ELECT	3.3MF	20%	50V
C231	1-123-356-00	ELECT	10MF	20%	16V
C232	1-130-626-00	FILM	0.033MF	5%	50V
C233	1-130-621-00	FILM	0.012MF	5%	50V
C234	1-108-565-00	MYLAR	0.0027MF	5%	50V
C235	1-108-563-00	MYLAR	0.0022MF	5%	50V

ELECTRICAL PARTS

Ref.No.	Part No.	Description			
C236	1-130-627-00	FILM	0.039MF	5%	50V
C237	1-130-627-00	FILM	0.039MF	5%	50V
C238	1-108-555-00	MYLAR	0.001MF	5%	50V
C239	1-130-627-00	FILM	0.039MF	5%	50V
C240	1-108-571-00	MYLAR	0.0047MF	5%	50V
C241	1-107-167-00	MICA	75PF	5%	500V
C243	1-123-319-00	ELECT	47MF	20%	16V
C301	1-123-332-00	ELECT	47MF	20%	25V
C302	1-123-294-00	ELECT	47MF	20%	6.3V
C303	1-123-323-00	ELECT	470MF	20%	16V
C304	1-123-380-00	ELECT	1MF	20%	50V
C305	1-131-371-00	TANTALUM	10MF	20%	16V
C306	1-123-328-00	ELECT	4.7MF	20%	25V
C307	1-161-377-00	CERAMIC	0.0047MF	20%	50V
C308	1-161-259-00	CERAMIC	10PF	5%	50V
C309	1-123-356-00	ELECT	10MF	20%	16V
C310	1-123-380-00	ELECT	1MF	20%	50V
C311	1-123-354-00	ELECT	3.3MF	20%	50V
C312	1-123-354-00	ELECT	3.3MF	20%	50V
C314	1-123-351-00	ELECT	0.47MF	20%	50V
C315	1-124-089-00	ELECT	2.2MF	20%	50V
C316	1-130-291-00	FILM	0.0056MF	5%	100V
C317	1-130-291-00	FILM	0.0056MF	5%	100V
C318	1-130-293-00	FILM	0.0068MF	5%	100V
C319	1-123-351-00	ELECT	0.47MF	20%	50V
C320	1-123-380-00	ELECT	1MF	20%	50V
C321	1-129-714-00	FILM	0.01MF	5%	630V
C322	1-129-928-00	FILM	0.0027MF	5%	630V
C323	1-129-898-00	FILM	0.0022MF	5%	630V
C324	1-123-308-00	ELECT	220MF	20%	10V
C325	1-101-880-00	CERAMIC	47PF	5%	50V
C401	1-123-298-00	ELECT	470MF	20%	6.3V
C402	1-123-328-00	ELECT	4.7MF	20%	25V
C403	1-108-571-00	MYLAR	0.0047MF	5%	50V
C412	1-123-354-00	ELECT	3.3MF	20%	50V
C413	1-123-380-00	ELECT	1MF	20%	50V
C414	1-123-323-00	ELECT	470MF	20%	16V
C415	1-123-298-00	ELECT	470MF	20%	6.3V
C416	1-108-563-00	MYLAR	0.0022MF	5%	50V
C417	1-161-328-00	CERAMIC	4700PF	30%	50V
C561	1-123-328-00	ELECT	4.7MF	20%	25V
C562	1-123-328-00	ELECT	4.7MF	20%	25V
C563	1-123-328-00	ELECT	4.7MF	20%	25V
C580	1-123-381-00	ELECT	2.2MF	20%	50V
C585	1-123-328-00	ELECT	4.7MF	20%	25V
C586	1-123-356-00	ELECT	10MF	20%	16V

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CAPACITORS:
- All capacitors are in μF. Common capacitors are omitted. Refer to the following lists for their part numbers. MF:μF, PF:μμF.

RESISTORS
- All resistors are in ohms. Common 1/4W, 1/8W and 1/16W carbon resistors are omitted. Refer to the following lists for their part numbers.
- F : nonflammable

COILS
- MMH : mH, UH : μH

SEMICONDUCTORS
In each case, U : μ, for example:
UA···: μA···, UPA···: μPA···, UPC···: μPC,
UPD···: μPD···

ELECTRICAL PARTS

Ref.No.	Part No.	Description
CNJ101	1-562-068-00	SOCKET, CONNECTOR 13P
♦CNJ102;	1-560-060-00	PIN, CONNECTOR 2P
♦CNJ103;	1-560-061-00	PIN, CONNECTOR 3P
♦CNJ104;	1-560-063-00	PIN, CONNECTOR 5P
♦CNJ105;	1-560-064-00	PIN, CONNECTOR 6P
♦CNJ106;	1-560-338-00	PIN, CONNECTOR 7P
♦CNJ107;	1-560-064-00	PIN, CONNECTOR 6P
CT101	1-141-225-00	CAP, TUNING, TRIMAR
CT201	1-141-225-00	CAP, TUNING, TRIMAR
D101	8-719-815-55	DIODE 1S1555
D102	8-719-815-55	DIODE 1S1555
D103	8-719-815-55	DIODE 1S1555
D201	8-719-815-55	DIODE 1S1555
D202	8-719-815-55	DIODE 1S1555
D203	8-719-815-55	DIODE 1S1555
D301	8-719-815-55	DIODE 1S1555
D302	8-719-815-55	DIODE 1S1555
D303	8-719-815-55	DIODE 1S1555
D304	8-719-815-55	DIODE 1S1555
D305	8-719-815-55	DIODE 1S1555
D306	8-719-815-55	DIODE 1S1555
D307	8-719-902-77	DIODE SLR34PC5
D308	8-719-902-77	DIODE SLR34PC5
D309	8-719-902-77	DIODE SLR34PC5
D310	8-719-902-77	DIODE SLR34PC5
D311	8-719-910-64	DIODE HZ6B1L
D312	8-719-200-02	DIODE 10E-2
D313	8-719-200-02	DIODE 10E-2
D401	8-719-815-55	DIODE 1S1555
D402	8-719-815-55	DIODE 1S1555
D403	8-719-815-55	DIODE 1S1555
D404	8-719-902-78	DIODE SLR34DC5
D405	8-719-934-05	DIODE SLR-34URC5
D406	8-719-902-51	DIODE SLP251B
D407	8-719-902-51	DIODE SLP251B
D408	8-719-902-51	DIODE SLP251B
D409	8-719-902-51	DIODE SLP251B
D410	8-719-902-51	DIODE SLP251B
D411	8-719-815-55	DIODE 1S1555
D412	8-719-815-55	DIODE 1S1555
D413	8-719-815-55	DIODE 1S1555
D414	8-719-815-55	DIODE 1S1555
D415	8-719-815-55	DIODE 1S1555
D416	8-719-815-55	DIODE 1S1555
D417	8-719-815-55	DIODE 1S1555

ELECTRICAL PARTS

Ref.No.	Part No.	Description
D561	8-719-901-33	DIODE 1SS133
D562	8-719-901-33	DIODE 1SS133
D563	8-719-901-33	DIODE 1SS133
D564	8-719-901-33	DIODE 1SS133
D565	8-719-901-33	DIODE 1SS133
D566	8-719-901-33	DIODE 1SS133
D567	8-719-901-33	DIODE 1SS133
D580	8-719-901-33	DIODE 1SS133
D581	8-719-901-33	DIODE 1SS133
D585	8-719-901-33	DIODE 1SS133
D586	8-719-901-33	DIODE 1SS133
HE	8-825-535-20	HEAD, ERASE (ES237-36)
HRP	8-825-548-10	R/P HEAD (PA242-3602)
IC101	8-759-300-74	IC CX-174A
IC201	8-759-300-74	IC CX-174A
IC301	8-759-932-80	IC BA328
IC302	8-759-800-32	IC LB1403
IC303	8-759-700-08	IC NJM4558S
IC401	8-759-200-63	IC TC9310N001
IC402	8-759-700-11	IC NJM78M05A
IC566	8-759-984-11	IC MB84011B
IC567	8-759-984-11	IC MB84011B
IC568	8-759-984-69	IC MB84069UB
IC585	8-759-985-01	IC MB84001B
L101	1-408-255-00	MICRO INDUCTOR 6.8MMH
L102	1-408-260-00	MICRO INDUCTOR 18MMH
L103	1-408-262-00	MICRO INDUCTOR 27MMH
L201	1-408-255-00	MICRO INDUCTOR 6.8MMH
L202	1-408-260-00	MICRO INDUCTOR 18MMH
L203	1-408-262-00	MICRO INDUCTOR 27MMH
L301	1-408-383-00	MICRO INDUCTOR 220MH
M1	1-541-201-00	MOTOR
PL1	1-518-512-11	LAMP, PILOT
PL2	1-518-512-21	LAMP, PILOT
PM1	1-454-316-00	SOLENOID, PLUNGER, HEAD
PM2	1-454-316-00	SOLENOID, PLUNGER, FF/REVERSE/AMS
Q101	8-729-334-58	TRANSISTOR 2SC1345
Q102	8-729-663-47	TRANSISTOR 2SC1364
Q103	8-729-100-13	TRANSISTOR 2SC2001
Q104	8-729-663-47	TRANSISTOR 2SC1364
Q105	8-729-663-47	TRANSISTOR 2SC1364
Q106	8-729-663-47	TRANSISTOR 2SC1364

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CAPACITORS:

- All capacitors are in μF. Common capacitors are omitted. Refer to the following lists for their part numbers. MF:μF, PF:μμF.

RESISTORS

- All resistors are in ohms. Common 1/4W, 1/8W and 1/16W carbon resistors are omitted. Refer to the following lists for their part numbers.
- F : nonflammable

COILS

- MMH : mH, UH : μH

SEMICONDUCTORS

In each case, U : μ, for example:
UA···: μA···, UPA···: μPA···, UPC···: μPC, UPD···: μPD···

ELECTRICAL PARTS

Ref.No.	Part No.	Description
Q107	8-729-663-47	TRANSISTOR 2SC1364
Q108	8-729-663-47	TRANSISTOR 2SC1364
Q109	8-729-663-47	TRANSISTOR 2SC1364
Q201	8-729-334-58	TRANSISTOR 2SC1345
Q202	8-729-663-47	TRANSISTOR 2SC1364
Q203	8-729-100-13	TRANSISTOR 2SC2001
Q204	8-729-663-47	TRANSISTOR 2SC1364
Q205	8-729-663-47	TRANSISTOR 2SC1364
Q206	8-729-663-47	TRANSISTOR 2SC1364
Q207	8-729-663-47	TRANSISTOR 2SC1364
Q208	8-729-663-47	TRANSISTOR 2SC1364
Q209	8-729-663-47	TRANSISTOR 2SC1364
Q301	8-759-100-22	IC UPA76V-FA
Q302	8-759-100-22	IC UPA76V-FA
Q303	8-729-663-47	TRANSISTOR 2SC1364
Q304	8-729-663-47	TRANSISTOR 2SC1364
Q305	8-729-663-47	TRANSISTOR 2SC1364
Q306	8-729-663-47	TRANSISTOR 2SC1364
Q307	8-729-201-52	TRANSISTOR 2SA1015
Q309	8-729-663-47	TRANSISTOR 2SC1364
Q310	8-729-663-47	TRANSISTOR 2SC1364
Q311	8-729-201-52	TRANSISTOR 2SA1015
Q312	8-729-663-47	TRANSISTOR 2SC1364
Q313	8-729-663-47	TRANSISTOR 2SC1364
Q314	8-729-663-47	TRANSISTOR 2SC1364
Q315	8-729-663-47	TRANSISTOR 2SC1364
Q316	8-729-201-52	TRANSISTOR 2SA1015
Q317	8-729-663-47	TRANSISTOR 2SC1364
Q318	8-729-180-93	TRANSISTOR 2SD809
Q319	8-729-663-47	TRANSISTOR 2SC1364
Q320	8-729-663-47	TRANSISTOR 2SC1364
Q321	8-729-663-47	TRANSISTOR 2SC1364
Q322	8-729-663-47	TRANSISTOR 2SC1364
Q401	8-729-201-52	TRANSISTOR 2SA1015
Q402	8-719-902-01	PHOTO INTERRUPTOR SPI201
Q403	8-729-245-83	TRANSISTOR 2SC2458
Q404	8-729-245-83	TRANSISTOR 2SC2458
Q405	8-729-245-83	TRANSISTOR 2SC2458
Q406	8-729-245-83	TRANSISTOR 2SC2458
Q407	8-729-245-83	TRANSISTOR 2SC2458
Q408	8-729-245-83	TRANSISTOR 2SC2458
Q409	8-729-201-52	TRANSISTOR 2SA1015
Q410	8-729-201-52	TRANSISTOR 2SA1015
Q411	8-729-245-83	TRANSISTOR 2SC2458
Q412	8-729-201-52	TRANSISTOR 2SA1015

ELECTRICAL PARTS

Ref.No.	Part No.	Description			
Q413	8-729-180-93	TRANSISTOR 2SD809			
Q580	8-729-663-47	TRANSISTOR 2SC1364			
Q581	8-729-201-51	TRANSISTOR 2SA1015			
Q585	8-729-663-47	TRANSISTOR 2SC1364			
R101	1-246-473-00	CARBON	1K	5%	1/4W
R102	1-246-521-00	CARBON	100K	5%	1/4W
R103	1-246-521-00	CARBON	100K	5%	1/4W
R104	1-246-523-00	CARBON	120K	5%	1/4W
R105	1-246-481-00	CARBON	2.2K	5%	1/4W
R106	1-246-511-00	CARBON	39K	5%	1/4W
R107	1-246-483-00	CARBON	2.7K	5%	1/4W
R108	1-246-455-00	CARBON	180	5%	1/4W
R109	1-246-521-00	CARBON	100K	5%	1/4W
R110	1-246-521-00	CARBON	100K	5%	1/4W
R111	1-246-521-00	CARBON	100K	5%	1/4W
R112	1-246-525-00	CARBON	150K	5%	1/4W
R113	1-246-473-00	CARBON	1K	5%	1/4W
R115	1-246-800-00	CARBON	27K	5%	1/8W
R116	1-246-507-00	CARBON	27K	5%	1/4W
R117	1-246-449-00	CARBON	100	5%	1/4W
R118	1-246-522-00	CARBON	110K	5%	1/4W
R119	1-246-490-00	CARBON	5.1K	5%	1/4W
R121	1-246-501-00	CARBON	15K	5%	1/4W
R122	1-246-503-00	CARBON	18K	5%	1/4W
R123	1-246-529-00	CARBON	220K	5%	1/4W
R124	1-246-787-00	CARBON	2.2K	5%	1/8W
R125	1-246-497-00	CARBON	10K	5%	1/4W
R126	1-246-497-00	CARBON	10K	5%	1/4W
R127	1-246-513-00	CARBON	47K	5%	1/4W
R128	1-246-513-00	CARBON	47K	5%	1/4W
R129	1-246-533-00	CARBON	330K	5%	1/4W
R130	1-246-530-00	CARBON	240K	5%	1/4W
R131	1-246-530-00	CARBON	240K	5%	1/4W
R132	1-246-499-00	CARBON	12K	5%	1/4W
R133	1-246-492-00	CARBON	6.2K	5%	1/4W
R134	1-246-449-00	CARBON	100	5%	1/4W
R135	1-246-455-00	CARBON	180	5%	1/4W
R136	1-246-463-00	CARBON	390	5%	1/4W
R137	1-246-475-00	CARBON	1.2K	5%	1/4W
R138	1-246-501-00	CARBON	15K	5%	1/4W
R139	1-246-509-00	CARBON	33K	5%	1/4W
R140	1-246-538-00	CARBON	510K	5%	1/4W
R141	1-246-513-00	CARBON	47K	5%	1/4W
R142	1-246-481-00	CARBON	2.2K	5%	1/4W
R143	1-246-497-00	CARBON	10K	5%	1/4W
R144	1-246-501-00	CARBON	15K	5%	1/4W

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ELECTRICAL PARTS

Ref.No.	Part No.	Description			
R145	1-246-473-00	CARBON	1K	5%	1/4W
R146	1-246-489-00	CARBON	4.7K	5%	1/4W
R147	1-246-473-00	CARBON	1K	5%	1/4W
R148	1-246-521-00	CARBON	100K	5%	1/4W
R149	1-246-523-00	CARBON	120K	5%	1/8W
R150	1-246-523-00	CARBON	120K	5%	1/8W
R151	1-246-771-00	CARBON	100	5%	1/8W
R152	1-246-788-00	CARBON	2.7K	5%	1/8W
R153	1-246-782-00	CARBON	820	5%	1/8W
R154	1-246-797-00	CARBON	15K	5%	1/8W
R155	1-246-505-00	CARBON	22K	5%	1/4W
R156	1-246-779-00	CARBON	470	5%	1/8W
R157	1-246-853-89	CARBON	6.2K	5%	1/8W
R158	1-246-852-00	CARBON	5.1K	5%	1/8W
R159	1-246-505-00	CARBON	22K	5%	1/4W
R160	1-246-787-00	CARBON	2.2K	5%	1/8W
R161	1-246-784-00	CARBON	1.2K	5%	1/8W
R162	1-246-505-00	CARBON	22K	5%	1/4W
R163	1-246-791-00	CARBON	4.7K	5%	1/8W
R164	1-246-796-00	CARBON	12K	5%	1/8W
R165	1-246-784-00	CARBON	1.2K	5%	1/8W
R166	1-246-505-00	CARBON	22K	5%	1/4W
R167	1-246-799-00	CARBON	22K	5%	1/8W
R201	1-246-473-00	CARBON	1K	5%	1/4W
R202	1-246-521-00	CARBON	100K	5%	1/4W
R203	1-246-521-00	CARBON	100K	5%	1/4W
R204	1-246-523-00	CARBON	120K	5%	1/4W
R205	1-246-481-00	CARBON	2.2K	5%	1/4W
R206	1-246-511-00	CARBON	39K	5%	1/4W
R207	1-246-483-00	CARBON	2.7K	5%	1/4W
R208	1-246-455-00	CARBON	180	5%	1/4W
R209	1-246-521-00	CARBON	100K	5%	1/4W
R210	1-246-521-00	CARBON	100K	5%	1/4W
R211	1-246-521-00	CARBON	100K	5%	1/4W
R212	1-246-525-00	CARBON	150K	5%	1/4W
R213	1-246-473-00	CARBON	1K	5%	1/4W
R215	1-246-800-00	CARBON	27K	5%	1/8W
R216	1-246-507-00	CARBON	27K	5%	1/4W
R217	1-246-449-00	CARBON	100	5%	1/4W
R218	1-246-522-00	CARBON	110K	5%	1/4W
R219	1-246-490-00	CARBON	5.1K	5%	1/4W
R221	1-246-501-00	CARBON	15K	5%	1/4W
R222	1-246-503-00	CARBON	18K	5%	1/4W
R223	1-246-529-00	CARBON	220K	5%	1/4W
R224	1-246-787-00	CARBON	2.2K	5%	1/8W

ELECTRICAL PARTS

Ref.No.	Part No.	Description			
R225	1-246-497-00	CARBON	10K	5%	1/4W
R226	1-246-497-00	CARBON	10K	5%	1/4W
R227	1-246-513-00	CARBON	47K	5%	1/4W
R228	1-246-513-00	CARBON	47K	5%	1/4W
R229	1-246-533-00	CARBON	330K	5%	1/4W
R230	1-246-530-00	CARBON	240K	5%	1/4W
R231	1-246-530-00	CARBON	240K	5%	1/4W
R232	1-246-499-00	CARBON	12K	5%	1/4W
R233	1-246-492-00	CARBON	6.2K	5%	1/4W
R234	1-246-449-00	CARBON	100	5%	1/4W
R235	1-246-455-00	CARBON	180	5%	1/4W
R236	1-246-463-00	CARBON	390	5%	1/4W
R237	1-246-475-00	CARBON	1.2K	5%	1/4W
R238	1-246-501-00	CARBON	15K	5%	1/4W
R239	1-246-509-00	CARBON	33K	5%	1/4W
R240	1-246-538-00	CARBON	510K	5%	1/4W
R241	1-246-513-00	CARBON	47K	5%	1/4W
R242	1-246-481-00	CARBON	2.2K	5%	1/4W
R243	1-246-497-00	CARBON	10K	5%	1/4W
R244	1-246-501-00	CARBON	15K	5%	1/4W
R245	1-246-473-00	CARBON	1K	5%	1/4W
R246	1-246-489-00	CARBON	4.7K	5%	1/4W
R247	1-246-473-00	CARBON	1K	5%	1/4W
R248	1-246-521-00	CARBON	100K	5%	1/4W
R249	1-246-523-00	CARBON	120K	5%	1/8W
R250	1-246-523-00	CARBON	120K	5%	1/8W
R251	1-246-771-00	CARBON	100	5%	1/8W
R252	1-246-788-00	CARBON	2.7K	5%	1/8W
R253	1-246-782-00	CARBON	820	5%	1/8W
R254	1-246-797-00	CARBON	15K	5%	1/8W
R255	1-246-505-00	CARBON	22K	5%	1/4W
R256	1-246-779-00	CARBON	470	5%	1/8W
R257	1-246-853-89	CARBON	6.2K	5%	1/8W
R258	1-246-852-00	CARBON	5.1K	5%	1/8W
R259	1-246-505-00	CARBON	22K	5%	1/4W
R260	1-246-787-00	CARBON	2.2K	5%	1/8W
R261	1-246-784-00	CARBON	1.2K	5%	1/8W
R262	1-246-505-00	CARBON	22K	5%	1/4W
R263	1-246-791-00	CARBON	4.7K	5%	1/8W
R264	1-246-796-00	CARBON	12K	5%	1/8W
R265	1-246-784-00	CARBON	1.2K	5%	1/8W
R266	1-246-505-00	CARBON	22K	5%	1/4W
R267	1-246-799-00	CARBON	22K	5%	1/8W
R301	1-246-491-00	CARBON	5.6K	5%	1/4W
R302	1-246-497-00	CARBON	10K	5%	1/4W

NOTE:

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- Items marked " ♠ " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- Due to standardization, parts with part numbers (Δ-ΔΔΔ-ΔΔΔ-XX or Δ-ΔΔΔΔ-ΔΔΔ-X) may be different from those used in the set.

CAPACITORS:

- All capacitors are in μF. Common capacitors are omitted. Refer to the following lists for their part numbers. MF:μF, PF:μμF.

RESISTORS

- All resistors are in ohms. Common 1/4W, 1/8W and 1/16W carbon resistors are omitted. Refer to the following lists for their part numbers.
- F : nonflammable

COILS

- MMH : mH, UH : μH

SEMICONDUCTORS

In each case, U : μ, for example:
UA···: μA···, UPA···: μPA···, UPC···: μPC, UPD···: μPD···

ELECTRICAL PARTS

Ref.No.	Part No.	Description			
R303	1-246-493-00	CARBON	6.8K	5%	1/4W
R304	1-246-485-00	CARBON	3.3K	5%	1/4W
R305	1-246-491-00	CARBON	5.6K	5%	1/4W
R306	1-246-489-00	CARBON	4.7K	5%	1/4W
R307	1-246-799-00	CARBON	22K	5%	1/8W
R308	1-246-505-00	CARBON	22K	5%	1/4W
R309	1-246-470-00	CARBON	750	5%	1/4W
R310	1-246-799-00	CARBON	22K	5%	1/8W
R311	1-246-793-00	CARBON	6.8K	5%	1/8W
R312	1-246-806-00	CARBON	82K	5%	1/8W
R313	1-246-779-00	CARBON	470	5%	1/8W
R314	1-246-811-00	CARBON	220K	5%	1/8W
R315	1-246-811-00	CARBON	220K	5%	1/8W
R316	1-246-781-00	CARBON	680	5%	1/8W
R317	1-246-791-00	CARBON	4.7K	5%	1/8W
R318	1-246-799-00	CARBON	22K	5%	1/8W
R319	1-247-046-00	CARBON	270K	5%	1/8W
R320	1-246-783-00	CARBON	1K	5%	1/8W
R321	1-246-799-00	CARBON	22K	5%	1/8W
R322	1-246-799-00	CARBON	22K	5%	1/8W
R323	1-246-799-00	CARBON	22K	5%	1/8W
R325	1-246-796-00	CARBON	12K	5%	1/8W
R326	1-246-792-00	CARBON	5.6K	5%	1/8W
R327	1-246-791-00	CARBON	4.7K	5%	1/8W
R328	1-246-811-00	CARBON	220K	5%	1/8W
R329	1-246-799-00	CARBON	22K	5%	1/8W
R330	1-246-799-00	CARBON	22K	5%	1/8W
R331	1-246-795-00	CARBON	10K	5%	1/8W
R332	1-246-497-00	CARBON	10K	5%	1/4W
R333	1-246-497-00	CARBON	10K	5%	1/4W
R334	1-246-795-00	CARBON	10K	5%	1/8W
R335	1-246-803-00	CARBON	47K	5%	1/8W
R336	1-246-791-00	CARBON	4.7K	5%	1/8W
R337	1-246-795-00	CARBON	10K	5%	1/8W
R338	1-246-799-00	CARBON	22K	5%	1/8W
R339	1-246-799-00	CARBON	22K	5%	1/8W
R340	1-246-455-00	CARBON	180	5%	1/4W
R341	1-246-481-00	CARBON	2.2K	5%	1/4W
R342	1-246-477-00	CARBON	1.5K	5%	1/4W
R343	1-246-482-00	CARBON	2.4K	5%	1/4W
R344	1-246-799-00	CARBON	22K	5%	1/8W
R345	1-246-799-00	CARBON	22K	5%	1/8W
R346	1-246-799-00	CARBON	22K	5%	1/8W
R347	1-246-505-00	CARBON	22K	5%	1/4W
R348	1-246-465-00	CARBON	470	5%	1/4W

ELECTRICAL PARTS

Ref.No.	Part No.	Description				
R351	1-246-427-00	CARBON	12	5%	1/4W	
R401	1-246-799-00	CARBON	22K	5%	1/8W	
R402	1-246-811-00	CARBON	220K	5%	1/8W	
R405	1-246-481-00	CARBON	2.2K	5%	1/4W	
R406	1-246-481-00	CARBON	2.2K	5%	1/4W	
R408	1-246-481-00	CARBON	2.2K	5%	1/4W	
R409	1-246-505-00	CARBON	22K	5%	1/4W	
R410	1-246-505-00	CARBON	22K	5%	1/4W	
R411	1-246-529-00	CARBON	220K	5%	1/4W	
R412	1-246-505-00	CARBON	22K	5%	1/4W	
R413	1-246-489-00	CARBON	4.7K	5%	1/4W	
R414	1-246-461-00	CARBON	330	5%	1/4W	
R415	1-246-799-00	CARBON	22K	5%	1/8W	
R416	1-246-801-00	CARBON	33K	5%	1/8W	
R417	1-246-465-00	CARBON	470	5%	1/4W	
R418	1-246-461-00	CARBON	330	5%	1/4W	
R419	1-246-491-00	CARBON	5.6K	5%	1/4W	
R420	1-246-491-00	CARBON	5.6K	5%	1/4W	
R421	1-246-509-00	CARBON	33K	5%	1/4W	
R422	1-246-514-00	CARBON	51K	5%	1/4W	
R423	1-246-505-00	CARBON	22K	5%	1/4W	
R424	1-246-521-00	CARBON	100K	5%	1/4W	
R425	1-246-795-00	CARBON	10K	5%	1/8W	
R426	1-246-780-00	CARBON	560	5%	1/8W	
R427	1-247-829-00	CARBON	820	5%	1/6W	
R429	1-206-477-00	METAL	39	5%	2W	F
R561	1-247-895-00	CARBON	470K	5%	1/6W	
R562	1-247-889-00	CARBON	270K	5%	1/6W	
R563	1-247-867-00	CARBON	33K	5%	1/6W	
R564	1-247-857-00	CARBON	12K	5%	1/6W	
R565	1-247-903-00	CARBON	1M	5%	1/6W	
R580	1-247-859-00	CARBON	15K	5%	1/6W	
R581	1-247-839-00	CARBON	2.2K	5%	1/6W	
R585	1-247-855-00	CARBON	10K	5%	1/6W	
R586	1-247-883-00	CARBON	150K	5%	1/6W	
R587	1-247-883-00	CARBON	150K	5%	1/6W	
R588	1-247-863-00	CARBON	22K	5%	1/6W	
R589	1-247-875-00	CARBON	68K	5%	1/6W	
RV101	1-226-236-00	RES, ADJ, CARBON 10K				
RV102	1-226-238-00	RES, ADJ, CARBON 50K				
RV201	1-226-236-00	RES, ADJ, CARBON 10K				

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CAPACITORS:

- All capacitors are in μF. Common capacitors are omitted. Refer to the following lists for their part numbers. MF:μF, PF:μμF.

RESISTORS

- All resistors are in ohms. Common 1/4W, 1/8W and 1/16W carbon resistors are omitted. Refer to the following lists for their part numbers.
- F : nonflammable

COILS

- MMH : mH, UH : μH

SEMICONDUCTORS

In each case, U : μ, for example:
UA···: μA···, UPA···: μPA···, UPC···: μPC, UPD···: μPD···

ELECTRICAL PARTS

Ref.No.	Part No.	Description
RV202	1-226-238-00	RES, ADJ, CARBON 50K
RV301	1-226-239-00	RES, ADJ, CARBON 100K
RY301	1-515-473-00	RELAY
S101	1-552-412-00	SWITCH, KEY BOARD, REC MUTE
S102	1-552-412-00	SWITCH, KEY BOARD, REC
S103	1-552-412-00	SWITCH, KEY BOARD, PAUSE
S104	1-552-412-00	SWITCH, KEY BOARD, FF
S105	1-552-412-00	SWITCH, KEY BOARD, FWD
S106	1-552-412-00	SWITCH, KEY BOARD, STOP
S107	1-552-412-00	SWITCH, KEY BOARD, REV
S108	1-552-412-00	SWITCH, KEY BOARD, FAST REV
S109	1-554-205-00	SWITCH, SLIDE, CASSETTE LOADING
S110	1-554-205-00	SWITCH, SLIDE, ERASE PROOF
S111	1-554-205-00	SWITCH, SLIDE, TAPE SELECT
S112	1-554-205-00	SWITCH, SLIDE, TAPE SELECT
S201	1-554-118-00	SWITCH, PUSH, DOLBY NR
S202	1-552-334-00	SWITCH, BAND CHANGER, TAPE SELECTOR
S203	1-554-277-00	SWITCH, SLIDE, ISS
T301	1-433-259-00	TRANSFORMER, BIAS OSCILLATOR

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CAPACITORS:

- All capacitors are in μF. Common capacitors are omitted. Refer to the following lists for their part numbers. MF:μF, PF:μμF.

RESISTORS

- All resistors are in ohms. Common 1/4W, 1/8W and 1/16W carbon resistors are omitted. Refer to the following lists for their part numbers.
- F : nonflammable

COILS

- MMH : mH, UH : μH

SEMICONDUCTORS

In each case, U : μ, for example:
UA···: μA···, UPA···: μPA···, UPC···: μPC, UPD···: μPD···

POWER SUPPLY UNIT
〔AC-78〕

SONY
POWER SUPPLY UNIT AC-78
FH-7
COMPACT HI-DENSITY COMPONENT SYSTEM
POWER

Note: AC-78 is a power supply unit in FH-7.

CIRCUIT DESCRIPTION

Shift Circuit

In the case of a conventional amp, high voltage is required to obtain large output, and even during small output, high voltage continues to be supplied.

The heat produced from the amplifier is proportional to the voltage applied.

However, all the unneeded voltage changes into heat. It is disadvantageous for a low-output amplifier such as this unit.

The shift circuit on this model is employed to limit the high voltage supplied during small output to the minimum necessary, and control heat.

Shift Circuit Operation

The output signals from both channels of the TA-78 power amplifier enter D101 – 104, and are separated into plus and minus output by this circuit.

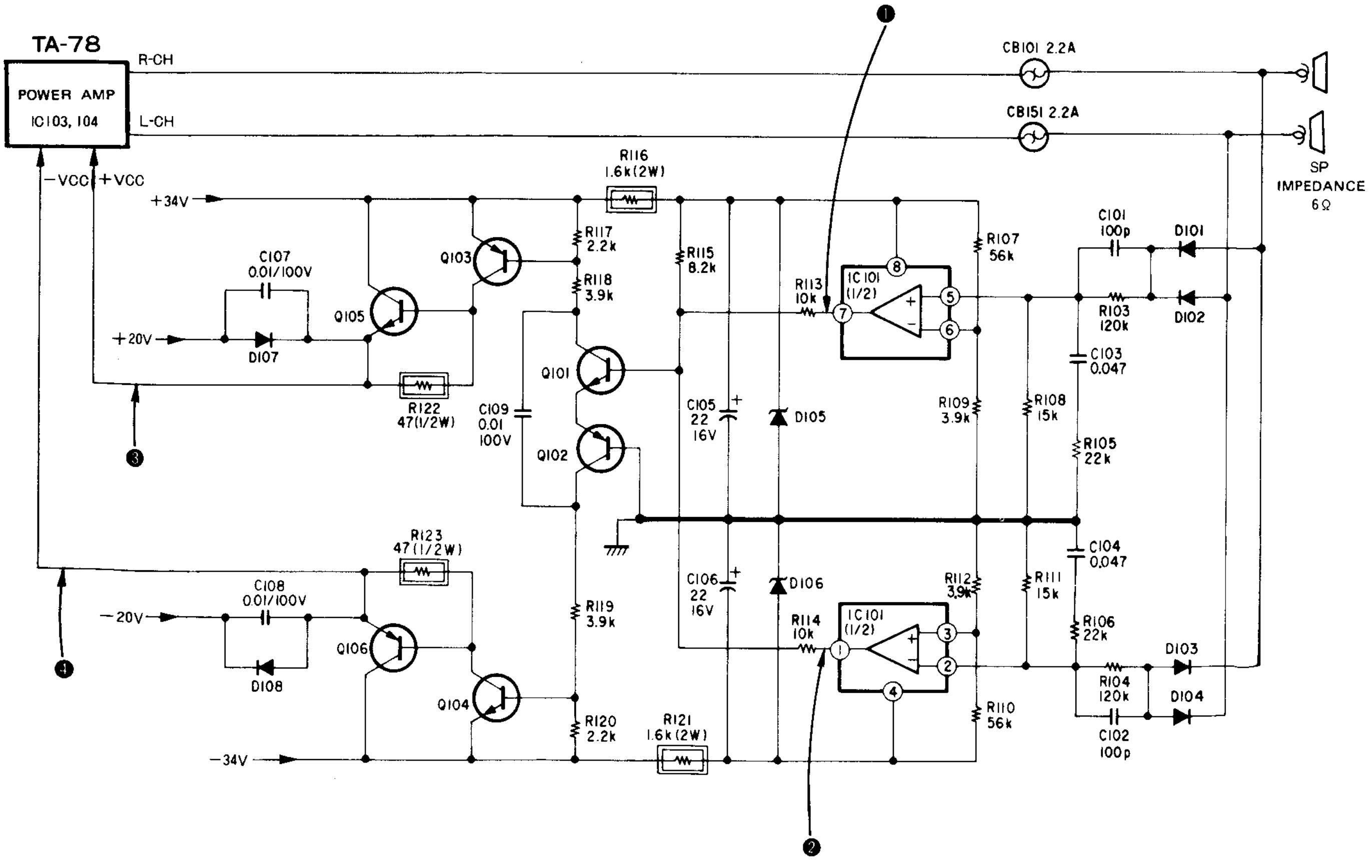
The detected output signal enters IC101, where it is compared with the level set at IC101 and the TA-78 output signal detected from D101 – 104.

During small output (approx. 5W), IC101 output goes low. At this time shift drive (Q101 – 104) all go off, and no bias is applied to Q105, Q106, which also go off, so +Vcc (+19V) and –Vcc (–19V) pass through D107, D108 respectively and are supplied to the power amplifier.

During large output (approx. 28W), IC101 output goes high. At this time shift drive (Q101 – 104) all go on, as do Q105, Q106.

±Vcc passes through Q105, Q106, becomes +Vcc (approx. +24.5V) and –Vcc (approx. –24V), and is supplied to the power amplifier. +Vcc (+19V) and –Vcc (–19V) are cut by D107, D108 being reverse biased.

Shift Circuit

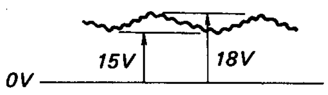
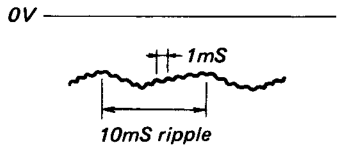
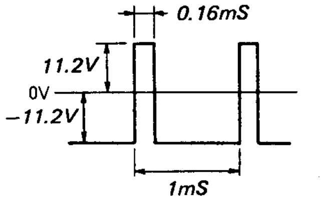
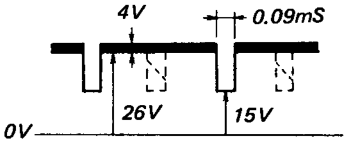
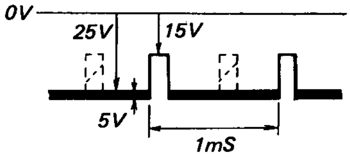
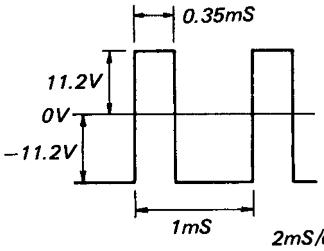
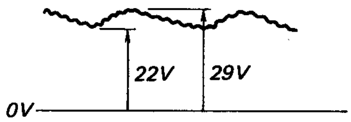
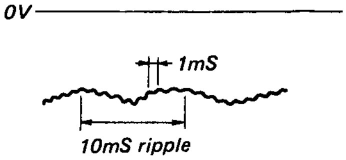

TA-78
POWER AMP
IC103, 104
R-CH
L-CH
–VCC
+VCC
+34V
R116 1.6k(2W)
CB101 2.2A
CB151 2.2A
SP IMPEDANCE 6Ω
C101 100p
D101
D102
R103 120k
C103 0.047
R105 22k
R107 56k
R117 2.2k
R118 3.9k
R115 8.2k
R113 10k
IC101 (1/2)
8
7
5
6
C107 0.01/100V
Q103
Q105
+20V
D107
Q101
R122 47(1/2W)
C109 0.01 100V
Q102
C105 22 16V
D105
R109 3.9k
R108 15k
R123 47(1/2W)
C108 0.01/100V
–20V
D108
Q106
Q104
R119 3.9k
R120 2.2k
R121 1.6k(2W)
–34V
C106 22 16V
D106
R114 10k
IC101 (1/2)
1
2
3
4
R112 3.9k
R111 15k
C104 0.047
R106 22k
D103
R104 120k
D104
C102 100p
R110 56k
❶
❷
❸
❹

Note: Waveforms and Voltage Values of check points ❶ – ❹.

Notes on Repair

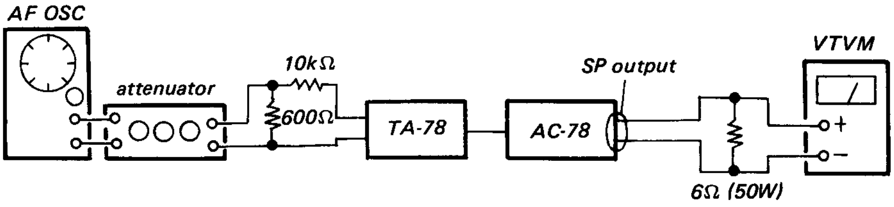
On this model's shift circuit, ±Vcc voltage changes according to the increase and decrease of the TA-78 output signal. This indicates that the shift circuitis operating properly. To check shift circuit operation, refer to the chart below.

Waveforms and Voltage Values of shift circuit operation check points ❶—❹.

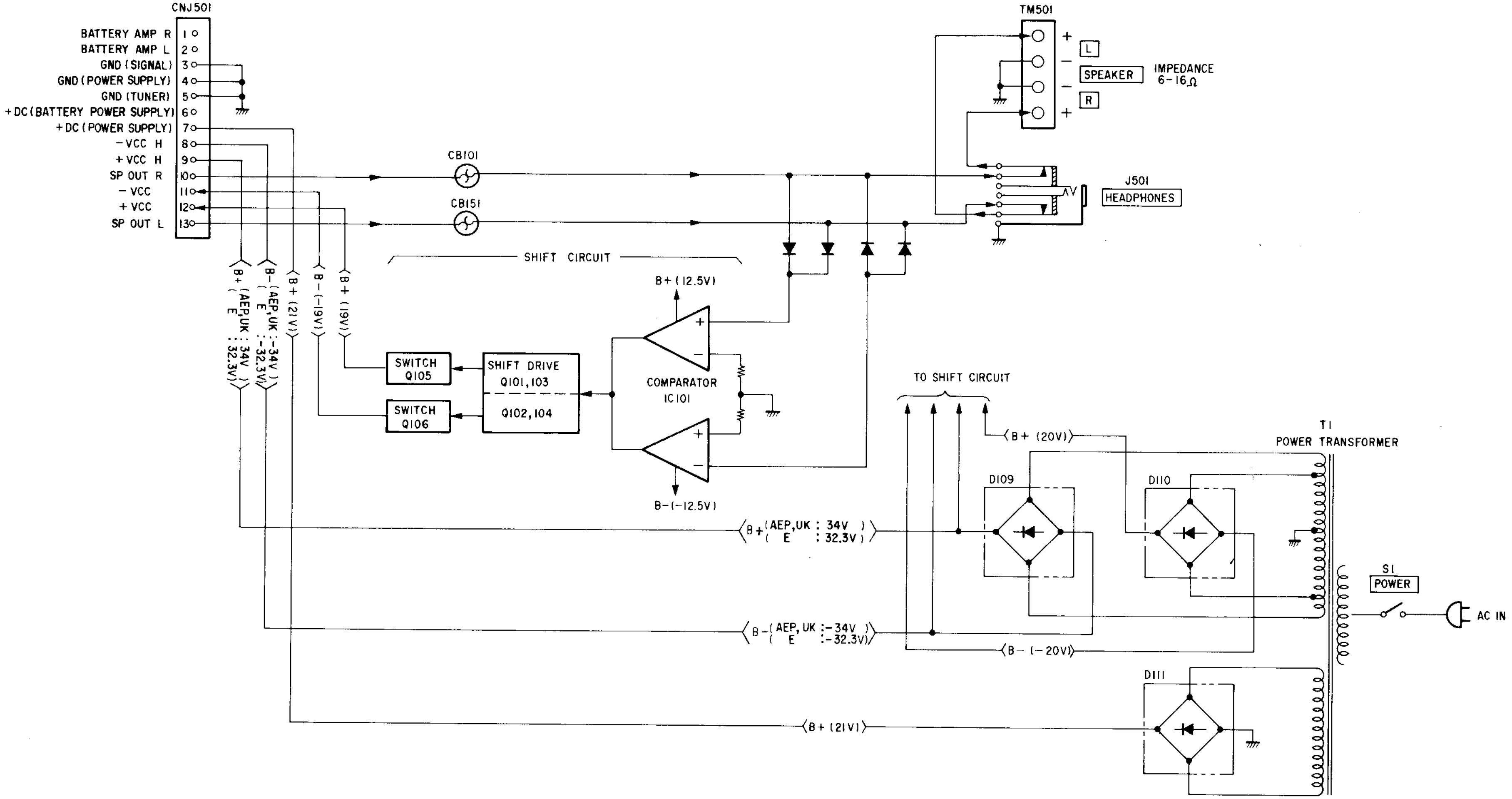
SP Output Voltage (VTVM)	❶, ❷	❸	❹
0V with no signal output	(−11.5V)	(+19V)	(−19V)
5.5V with low output	(−11.5V)	(+16.5V)  2mS/div	(−16.5V)  0V 1mS 10mS ripple 2mS/div
8V with normal output	(−7.4V)  0.16mS 11.2V 0V −11.2V 1mS 0.2mS/div	(+26.5V)  4V 0.09mS 0V 26V 15V *Note: Square wave or sawtooth wave may appear at the sections indicated by dotted lines in the diagram.* 0.2mS/div	(−26.5V)  0V 25V 15V 5V 1mS *Note: Square wave or sawtooth wave may appear at the sections indicated by dotted lines in the diagram.* 0.2mS/div
13V with high output	(−3.2V)  0.35mS 11.2V 0V −11.2V 1mS 2mS/div	(+24.5V)  2mS/div	(−24.5V)  0V 1mS 10mS ripple 2mS/div

( ) : VOM voltage values

AF OSC 1kHz (sinewave)
SP impedance : 6Ω/with both channels driven

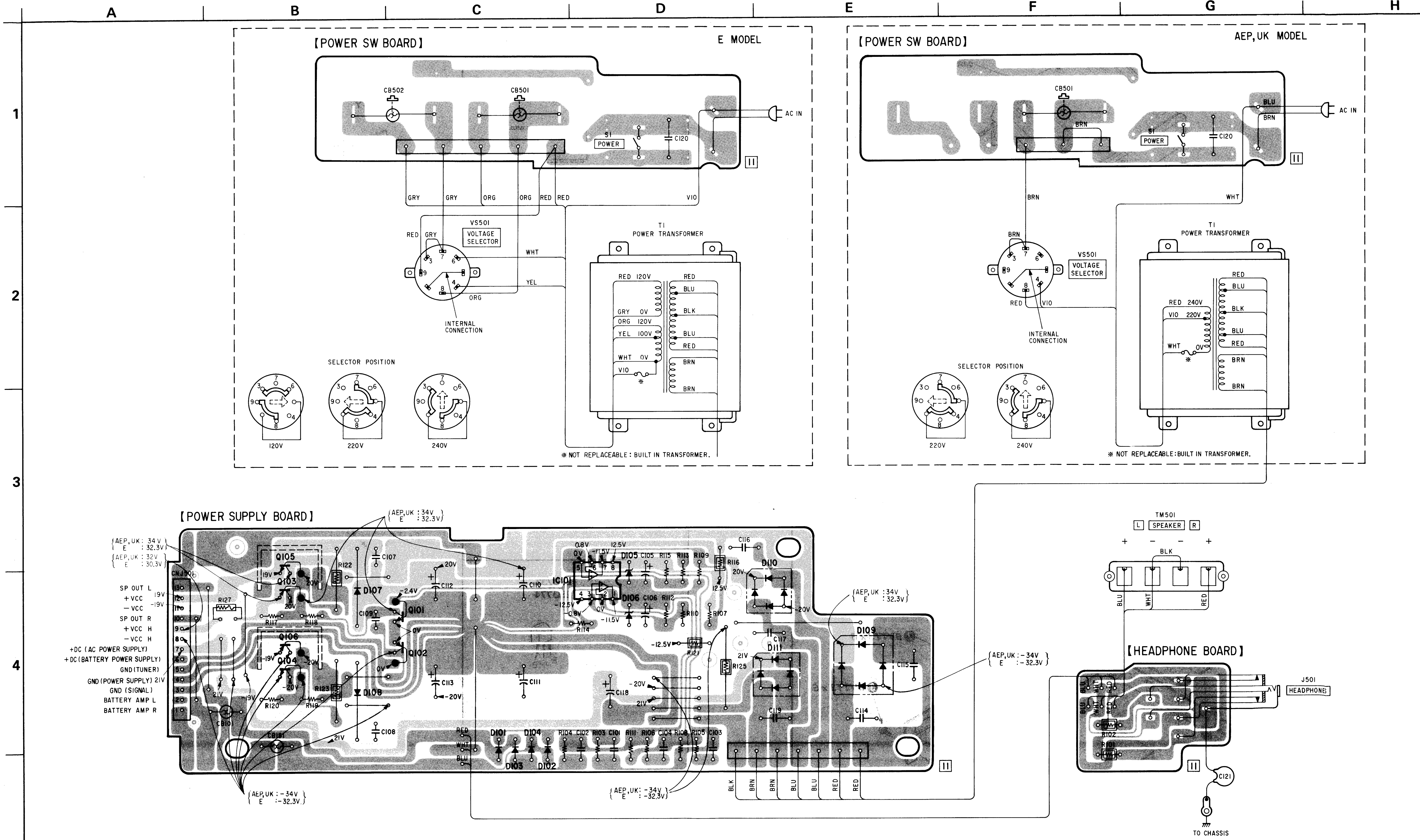

AF OSC
attenuator
10kΩ
600Ω
TA-78
AC-78
SP output
VTVM
+
−
6Ω (50W)

SECTION 1
BLOCK DIAGRAM


CNJ501
BATTERY AMP R 1
BATTERY AMP L 2
GND (SIGNAL) 3
GND (POWER SUPPLY) 4
GND (TUNER) 5
+DC (BATTERY POWER SUPPLY) 6
+DC (POWER SUPPLY) 7
-VCC H 8
+VCC H 9
SP OUT R 10
-VCC 11
+VCC 12
SP OUT L 13
B+ (AEP,UK : 34V) (E : 32.3V)
B- (AEP,UK : -34V) (E : -32.3V)
B+ (21V)
B- (-19V)
B+ (19V)
CB101
CB151
SHIFT CIRCUIT
SWITCH Q105
SWITCH Q106
SHIFT DRIVE Q101, 103
Q102, 104
B+ (12.5V)
B- (-12.5V)
COMPARATOR IC101
TM501
L
SPEAKER
R
IMPEDANCE 6-16Ω
J501
HEADPHONES
TO SHIFT CIRCUIT
B+ (20V)
B- (-20V)
D109
D110
D111
T1 POWER TRANSFORMER
S1 POWER
AC IN
B+ (21V)

SECTION 3 DIAGRAMS

3-1. MOUNTING DIAGRAM


A
B
C
D
E
F
G
H
1
2
3
4
5
[POWER SW BOARD]
E MODEL
CB502
CB501
S1
POWER
C120
AC IN
GRY
GRY
ORG
ORG
RED
RED
VIO
VS501
VOLTAGE SELECTOR
RED
GRY
WHT
YEL
ORG
INTERNAL CONNECTION
T1
POWER TRANSFORMER
RED 120V
GRY 0V
ORG 120V
YEL 100V
WHT 0V
VIO
RED
BLU
BLK
BLU
RED
BRN
BRN
SELECTOR POSITION
120V
220V
240V
※ NOT REPLACEABLE: BUILT IN TRANSFORMER.
[POWER SW BOARD]
AEP, UK MODEL
CB501
BLU
BRN
BRN
S1
POWER
C120
AC IN
BRN
WHT
VS501
VOLTAGE SELECTOR
RED
VIO
INTERNAL CONNECTION
T1
POWER TRANSFORMER
RED 240V
VIO 220V
WHT 0V
RED
BLU
BLK
BLU
RED
BRN
BRN
SELECTOR POSITION
220V
240V
※ NOT REPLACEABLE: BUILT IN TRANSFORMER.
[POWER SUPPLY BOARD]
(AEP, UK : 34V / E : 32.3V)
(AEP, UK : 32V / E : 30.3V)
CN401
SP OUT L
+VCC
−VCC
SP OUT R
+VCC H
−VCC H
+DC (AC POWER SUPPLY)
+DC (BATTERY POWER SUPPLY)
GND (TUNER)
GND (POWER SUPPLY) 21V
GND (SIGNAL)
BATTERY AMP L
BATTERY AMP R
Q105
Q103
Q106
Q104
Q101
Q102
IC101
R127
R117
R118
R119
R120
R122
R123
D107
D108
C107
C109
C112
C110
C113
C111
C108
C101
C102
C103
C104
C105
C106
C114
C115
C116
C117
C118
C119
D101
D102
D103
D104
D105
D106
D109
D110
D111
R104
R105
R106
R107
R108
R109
R110
R111
R112
R113
R114
R115
R116
R121
R125
CB101
CB102
19V
−19V
20V
−20V
21V
2.4V
0V
0.8V
12.5V
−12.5V
11.5V
−11.5V
(AEP, UK : 34V / E : 32.3V)
(AEP, UK : −34V / E : −32.3V)
RED
WHT
BLU
BLK
BRN
BRN
BLU
BLU
RED
RED
TM501
L
SPEAKER
R
+
−
−
+
BLK
BLU
WHT
RED
[HEADPHONE BOARD]
R101
R102
J501
HEADPHONES
C121
TO CHASSIS

IC Q	105 103 106 104		101 102		IC101				IC Q
D		107 108		101 103 104 102		105 106	110 111	109	D

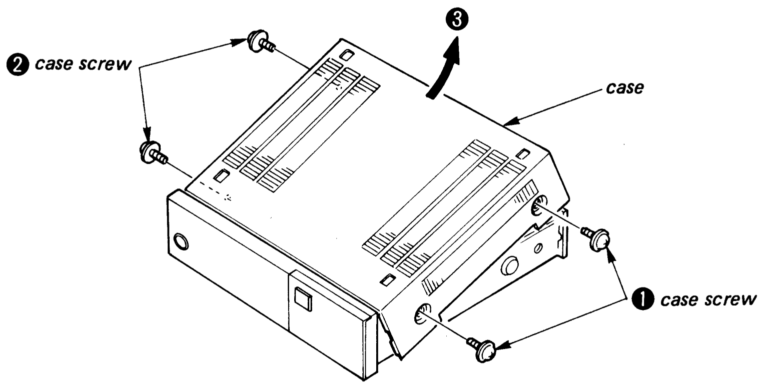
Note:

- ○—: parts extracted from the component side.
- ▨ : B+ pattern

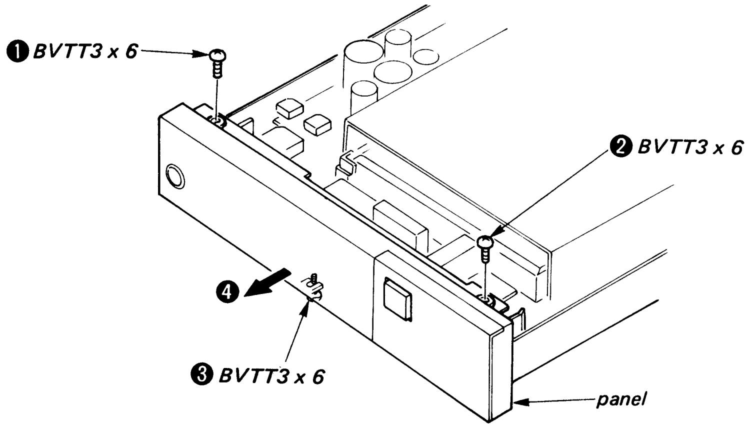
SECTION 2
DISASSEMBLY

Note: Follow the disassembly procedure in the numerical order given.

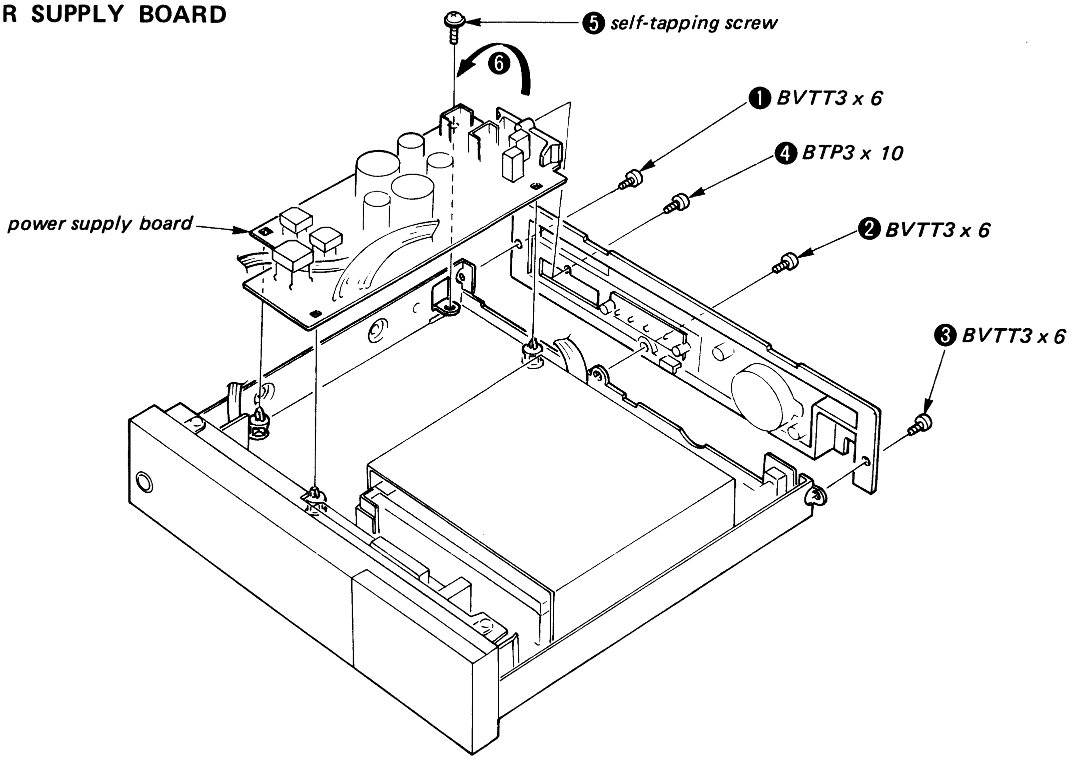
CASE


❷ case screw
❸
case
❶ case screw

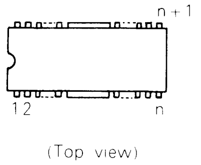
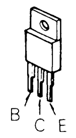
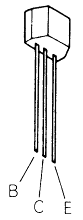
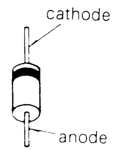
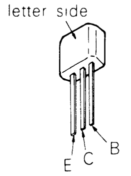
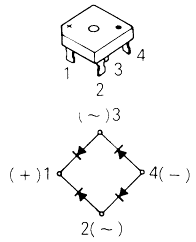
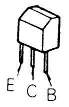
PANEL


❶ BVTT3 x 6
❷ BVTT3 x 6
❹
❸ BVTT3 x 6
panel

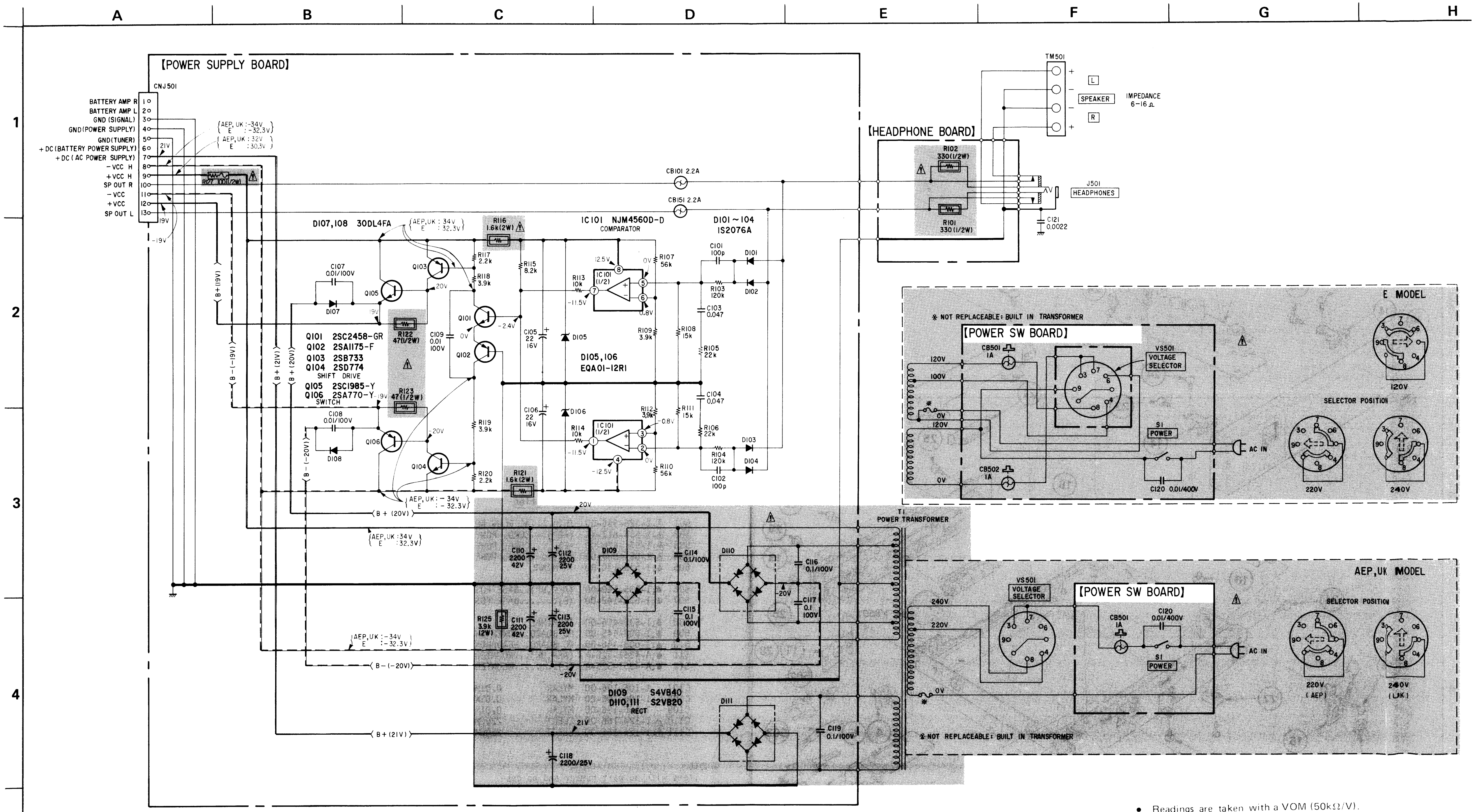
POWER SUPPLY BOARD


❺ self-tapping screw
❻
❶ BVTT3 x 6
❹ BTP3 x 10
❷ BVTT3 x 6
❸ BVTT3 x 6
power supply board

SEMICONDUCTOR LEAD LAYOUTS

NJM4560D-D  n+1 12 n (Top view)	**2SA770-Y** **2SC1985-Y** 
2SC2458 **2SC2458-GR**  	**1S1585** **1S2076A** **30DL4** **30DL4FA** **EQA01-12R1**  cathode anode
2SA1175 **2SA1175-F**  letter side E C B	**S2VB20** **S4VB40** 
2SB733 **2SD774**  	

3-2. SCHEMATIC DIAGRAM

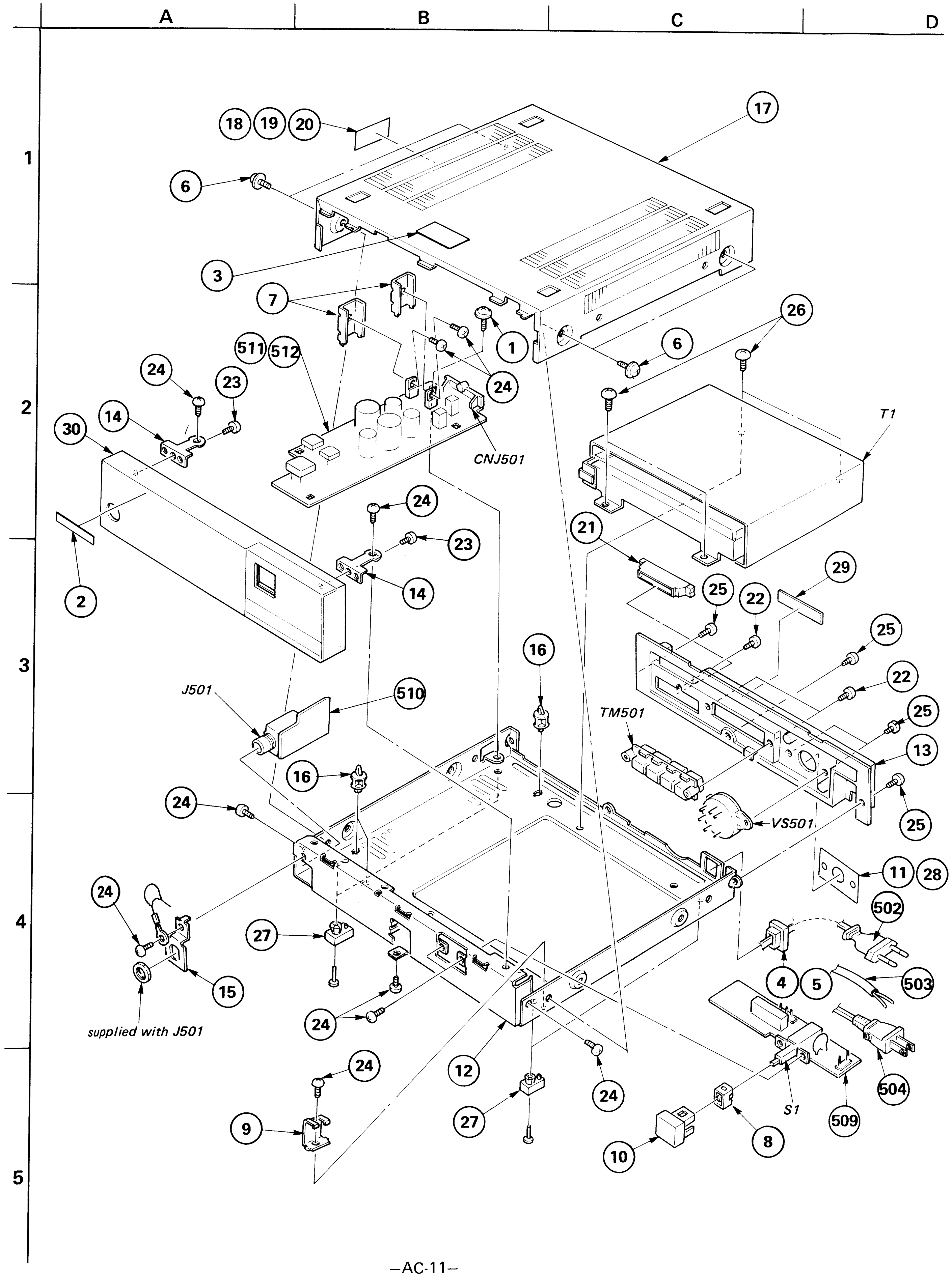

A
B
C
D
E
F
G
H
1
2
3
4
5
[POWER SUPPLY BOARD]
CNJ501
BATTERY AMP R 1
BATTERY AMP L 2
GND (SIGNAL) 3
GND (POWER SUPPLY) 4
GND (TUNER) 5
+DC (BATTERY POWER SUPPLY) 6
+DC (AC POWER SUPPLY) 7
-VCC H 8
+VCC H 9
SP OUT R 10
-VCC 11
+VCC 12
SP OUT L 13
R127 100(1/2W)
CB101 2.2A
CB151 2.2A
D107,108 30DL4FA
R116 1.6k(2W)
IC101 NJM4560D-D
COMPARATOR
D101~104 1S2076A
Q101 2SC2458-GR
Q102 2SA1175-F
Q103 2SB733
Q104 2SD774
SHIFT DRIVE
Q105 2SC1985-Y
Q106 2SA770-Y
SWITCH
R122 47(1/2W)
R123 47(1/2W)
D105,106 EQA01-12R1
R121 1.6k(2W)
D109 S4VB40
D110,111 S2VB20
RECT
C118 2200/25V
T1 POWER TRANSFORMER
[HEADPHONE BOARD]
R102 330(1/2W)
R101 330(1/2W)
J501 HEADPHONES
C121 0.0022
TM501
L
SPEAKER
R
IMPEDANCE 6-16Ω
E MODEL
※ NOT REPLACEABLE: BUILT IN TRANSFORMER
[POWER SW BOARD]
CB501 1A
CB502 1A
VS501 VOLTAGE SELECTOR
S1 POWER
C120 0.01/400V
AC IN
SELECTOR POSITION
120V
220V
240V
AEP,UK MODEL
220V (AEP)
240V (UK)
※ NOT REPLACEABLE: BUILT IN TRANSFORMER

Note:
- All capacitors are in μF unless otherwise noted. pF : μμF 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in ohms, ¼W unless otherwise noted. kΩ : 1000Ω, MΩ : 1000kΩ
- ▭ : nonflammable resistor.
- ▭ : fusible resistor.
- ▭ : panel designation.
- ——— : B+ bus.
- – – – : B- bus.
- Voltages are dc with respect to ground unless otherwise noted.

- Readings are taken with a VOM (50kΩ/V).
- Voltage variations may be noted due to normal production tolerances.

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

SECTION 4
EXPLODED VIEW AND PARTS LIST



GENERAL SECTION

No.	Part No.	Description
1	3-701-589-00	SCREW, SELF-TAPPING
2	3-701-690-00	(UK).......LABEL (MADE IN JAPAN)
3	3-703-043-21	(UK).......LABEL, CAUTION, MAIN
4	⚠.3-703-244-00	(AEP,UK)...BUSHING, CORD
5	⚠.3-703-571-00	(E)........BUSHING (S), CORD
6	3-703-354-11	SCREW (OS), CASE, CLAW
7	●;4-854-790-00	HEAT SINK
8	4-864-307-00	RING
9	●;4-884-808-00	(AEP,UK)....PROTECTOR
10	4-884-810-00	KNOB (16X16) (POWER), SQUARE
11	4-884-812-00	(AEP,UK)...LABEL
12	●;4-884-815-00	CHASSIS
13	4-884-816-00	PLATE, JACK
14	●;4-884-820-00	BRACKET (B)
15	●;4-884-824-00	BRACKET, H.P
16	●;4-884-834-00	SUPPORT, PC
17	4-884-841-00	CASE
18	4-884-867-00	LABEL, MODEL NUMBER (AEP)
19	4-884-868-00	LABEL, MODEL NUMBER (UK)
20	4-884-869-00	LABEL, MODEL NUMBER (E1/E2)
21	4-884-874-00	COVER, CONNECTOR (A)
22	7-685-547-19	SCREW +BTP 3X10 TYPE2 N-S
23	7-685-646-11	SCREW +BVTP 3X8 TYPE2 N-S
24	7-685-871-01	SCREW +BVTT 3X6 (S)
25	7-685-871-09	SCREW +BVTT 3X6 (S)
26	7-685-880-01	SCREW +BVTT 4X6 (S)
27	X-4884-801-0	FOOT ASSY, RUBBER
28	4-884-921-00	(E)....LABEL
29	4-884-920-00	LABEL
30	X-4884-812-1	PANEL ASSY

ELECTRICAL PARTS

Ref.No.	Part No.	Description				
501	⚠.1-526-565-00	(E1)....AC PLUG ADAPTER				
502	⚠.1-534-817-XX	(AEP)...CORD, POWER, EULO PLUG				
503	⚠.1-551-628-00	(E).....CORD, POWER				
504	⚠.1-551-884-00	(UK)....CORD, POWER				
505	●;1-535-120-00	TERMINAL				
506	●;1-535-140-00	(AEP,UK)..BASE POST 19MM (10MM PITCH)				
507	●;1-535-142-00	(E).......BASE POST 19MM (10MM PITCH)				
508	●;1-535-416-00	TERMINAL				
509	●;1-608-445-00	PC BOARD, POWER SW				
510	●;1-608-446-00	PC BOARD, HEADPHONE				
511	●;A-4351-325-A	(AEP,UK)...MOUNTED PCB, POWER SUPPLY				
512	●;A-4351-326-A	(E)........MOUNTED PCB, POWER SUPPLY				
C107	1-106-196-00	MYLAR	0.01MF	5%	100V	
C108	1-106-196-00	MYLAR	0.01MF	5%	100V	
C109	1-106-196-00	MYLAR	0.01MF	5%	100V	
C110	⚠.1-124-166-00	ELECT	2200MF	20%	42V	
C111	⚠.1-124-166-00	ELECT	2200MF	20%	42V	
C112	⚠.1-123-918-00	ELECT	2200MF	20%	25V	
C113	⚠.1-123-918-00	ELECT	2200MF	20%	25V	
C114	⚠.1-108-389-00	MYLAR	0.1MF	10%	100V	
C115	⚠.1-108-389-00	MYLAR	0.1MF	10%	100V	
C116	⚠.1-108-389-00	MYLAR	0.1MF	10%	100V	
C117	⚠.1-108-389-00	MYLAR	0.1MF	10%	100V	
C118	⚠.1-123-918-00	ELECT	2200MF	20%	25V	
C119	⚠.1-108-389-00	MYLAR	0.1MF	10%	100V	
C120	⚠.1-161-744-00	CERAMIC	0.01MF		400V	
CB101	1-532-564-00	BREAKER, CIRCUIT				
CB151	1-532-564-00	BREAKER, CIRCUIT				
CB501	⚠.1-532-535-00	CIRCUIT BREAKER				
CB502	⚠.1-532-535-00	(E)....CIRCUIT BREAKER				
CNJ501	1-562-068-00	SOCKET, CONNECTOR 13P				
D101	8-719-815-85	DIODE 1S1585				
D102	8-719-815-85	DIODE 1S1585				
D103	8-719-815-85	DIODE 1S1585				
D104	8-719-815-85	DIODE 1S1585				
D105	8-719-991-21	DIODE EQA01-12R1				
D106	8-719-991-21	DIODE EQA01-12R1				
D107	8-719-230-24	DIODE 30DL4				
D108	8-719-230-24	DIODE 30DL4				
D109	⚠.8-719-504-40	DIODE S4VB40				
D110	⚠.8-719-502-20	DIODE S2VB20				
D111	⚠.8-719-502-20	DIODE S2VB20				
IC101	8-759-745-61	IC NJM4560D-D				
J501	1-507-689-00	JACK, LARGE TYPE				
Q101	8-729-245-83	TRANSISTOR 2SC2458				
Q102	8-729-117-54	TRANSISTOR 2SA1175				
Q103	8-729-113-32	TRANSISTOR 2SB733				
Q104	8-729-177-43	TRANSISTOR 2SD774				
Q105	8-729-300-44	TRANSISTOR 2SC1985-Y				
Q106	8-729-300-42	TRANSISTOR 2SA770-Y				
R101	⚠.1-247-228-00	CARBON	330	5%	1/2W	F
R102	⚠.1-247-228-00	CARBON	330	5%	1/2W	F
R116	⚠.1-206-669-00	METAL	1.6K	5%	2W	F
R121	⚠.1-206-669-00	METAL	1.6K	5%	2W	F
R122	⚠.1-247-208-00	CARBON	47	5%	1/2W	F
R123	⚠.1-247-208-00	CARBON	47	5%	1/2W	F
R125	⚠.1-206-678-00	METAL	3.9K	5%	2W	F
R127	⚠.1-212-982-00	FUSIBLE	100	5%	1/2W	F
S1	⚠.1-553-318-00	SWITCH, PUSH (AC POWER)				
T1	⚠.1-447-408-00	(E)........TRANSFORMER, POWER				
T1	⚠.1-447-407-00	(AEP,UK)...TRANSFORMER, POWER				
TM501	1-536-705-21	TERMINAL BOARD (SP)				
VS501	⚠1-526-576-51	SELECTOR, POWER VOLTAGE				

NOTE:

- Items with no part number and no description are not stocked because they are seldom required for routine service.
- Items marked " ● " are not stocked since thev are seldom required for routine service. Some delay should be anticipated when ordering these items.
- Due to standardization, parts with part numbers (Δ-ΔΔΔ-ΔΔΔ-XX or Δ-ΔΔΔΔ-ΔΔΔ-X) may be different from those used in the set.

CAPACITORS:

- All capacitors are in μF. Common capacitors are omitted. Refer to the following lists for their part numbers. MF:μF, PF:μμF.

RESISTORS

- All resistors are in ohms. Common 1/4W, 1/8W and 1/16W carbon resistors are omitted. Refer to the following lists for their part numbers.
- F : nonflammable

COILS

- MMH : mH, UH : μH

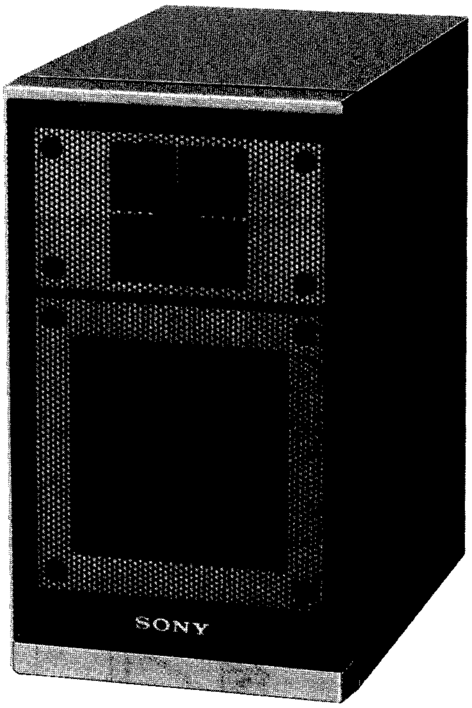
SEMICONDUCTORS

In each case, U : μ, for example:
UA···: μA···, UPA···: μPA···, UPC···: μPC, UPD···: μPD···

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

SPEAKER SYSTEM

[SS-78]



Note: SS-78 is a speaker system in FH-7.

FEATURES

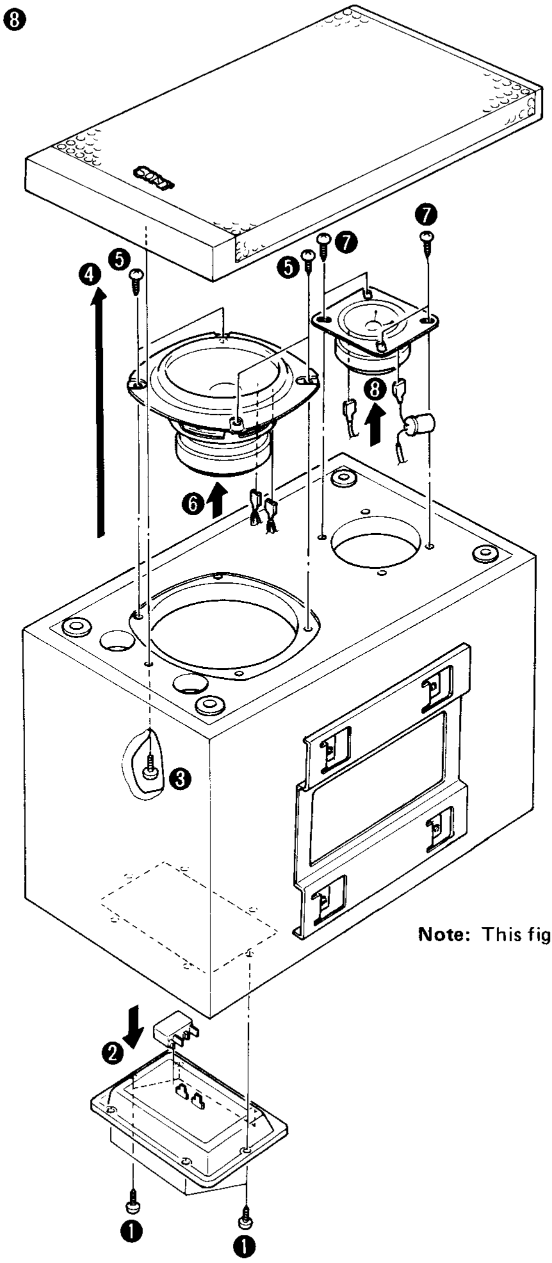
- ○ 2-way, 2-speaker bass reflex type speaker system.
- ○ Attachments included for mounting or using as portables.
- ○ Designed for high sound quality in spite of small size.

1. DISASSEMBLY

SPEAKER UNIT REMOVAL

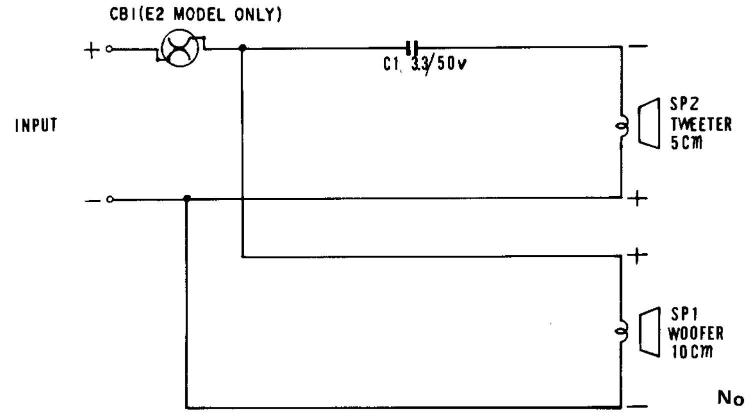
Note: Follow the disassembly procedure in the numerical order given.

Woofer: ❶ – ❻
Tweeter: ❶ – ❹ , ❼ , ❽



Note: This figure illustrates the LEFT enclosure.

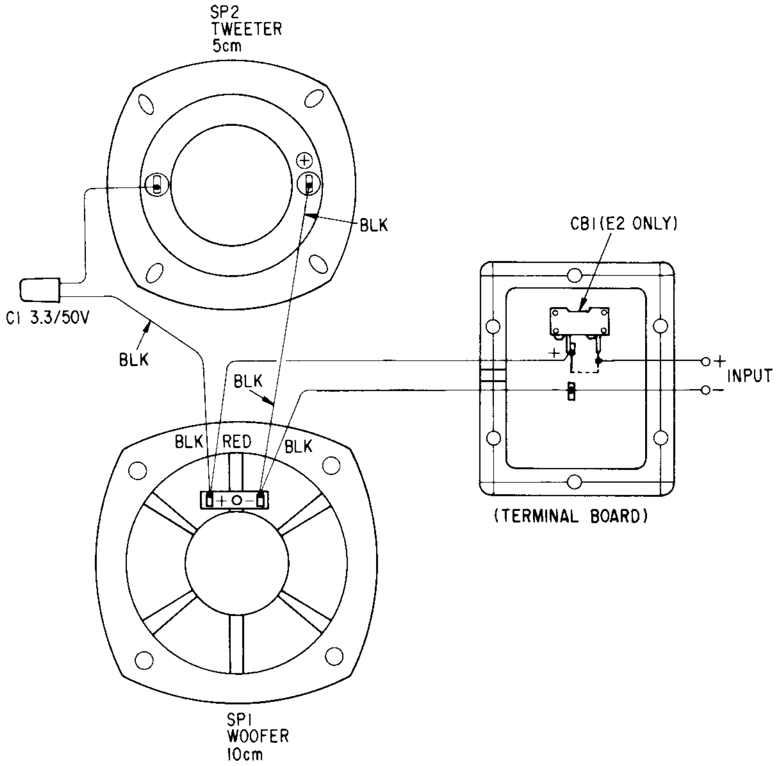
2. SCHEMATIC DIAGRAM


CB1(E2 MODEL ONLY)
+
C1 3.3/50V
INPUT
–
SP2
TWEETER
5cm
+
+
SP1
WOOFER
10cm
–

Note: All capacitors are in μF.

CAUTION:
Be careful to the polarity of the speaker when connecting the speaker.

3. WIRING DIAGRAM


SP2
TWEETER
5cm
BLK
C1 3.3/50V
BLK
BLK
BLK
RED
BLK
CB1(E2 ONLY)
+
INPUT
–
(TERMINAL BOARD)
SP1
WOOFER
10cm

4. PARTS LIST

GENERAL SECTION

No.	Part No.	Description
1	4-874-614-11	SCREW +BVTP 3.5X14
2	4-874-614-21	SCREW +BVTP 3.5X14
3	♠ 4-875-621-00	LABEL, CAUTION
4	4-883-903-00	HOOK
5	4-883-911-00	LABEL, MODEL NUMBER
6	4-883-913-00	PLATE, SIDE (B)
7	4-883-918-01	SCREW TP +BVWH 4X23
8	X-4883-901-0	PANEL ASSY, FRONT
9	X-4883-902-0	BOX ASSY (LEFT), SPEAKER
10	X-4883-903-0	BOX ASSY (RIGHT), SPEAKER

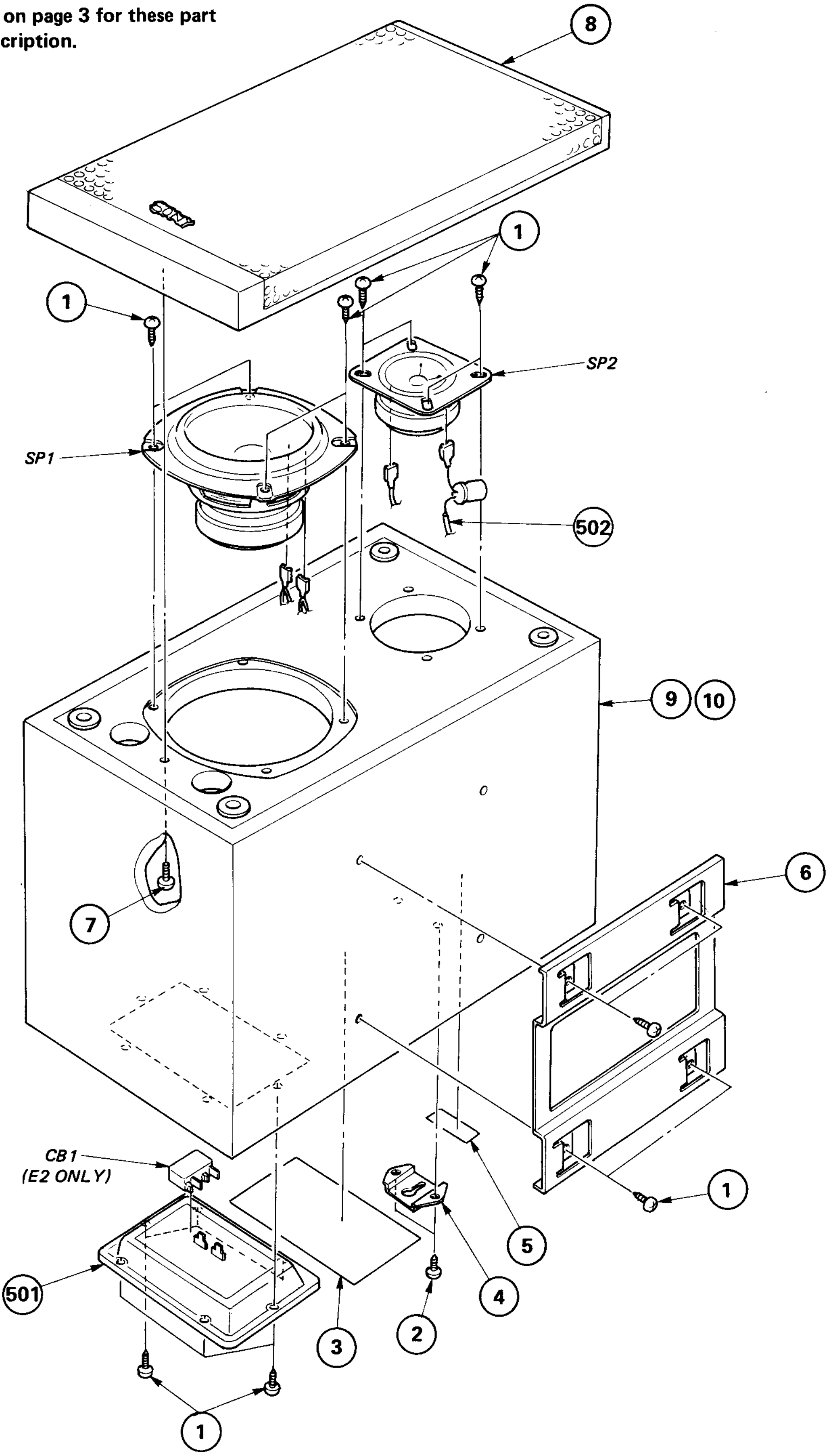
ELECTRICAL PARTS

Ref.No.	Part No.	Description
501	1-536-740-00	TERMINAL BOARD, SPEAKER
502	1-556-472-11	CORD, SPEAKER (WITH CAPACITOR)
CB1	1-532-664-00	(E2 ONLY)...BREAKER, CIRCUIT (1.25A)
SP1	1-503-168-00	SPEAKER (WOOFER) 10CM
SP2	1-503-169-00	SPEAKER (TWEETER) 5CM

NOTE:
- Items marked " ♠ " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

5. EXPLODED VIEW

- **See the parts list on page 3 for these part numbers and description.**


8
1
1
SP2
SP1
502
9
10
7
6
CB1
(E2 ONLY)
501
5
4
3
2
1
1

POWER SUPPLY UNIT
(AC-78)

FH-7
AC-78

AEP Model
UK Model

SUPPLEMENT

File this supplement with the service manual.

No. 1
October, 1982

SERIAL NUMBER : 720,001 AND LATER

CIRCUIT CHANGE

Ref. No.	Part Number	Description	Remarks
C107	1-106-196-00	MYLAR 0.01MF 5% 100V	Deleted
C108	1-106-196-00	MYLAR 0.01MF 5% 100V	Deleted
R128	⚠ 1-212-354-00	METAL 0.33 10% 1W	Added
R129	⚠ 1-532-675-00	CIRCUIT PROTECTOR	Added
R130	⚠ 1-532-675-00	CIRCUIT PROTECTOR	Added

- **PART CHANGE**

[FORMER]

Ref. No.	Description
Q103	2SB733

➡

[NEW]

Ref. No.	Part Number	Description
Q103	8-729-103-43	TRANSISTOR 2SB734

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

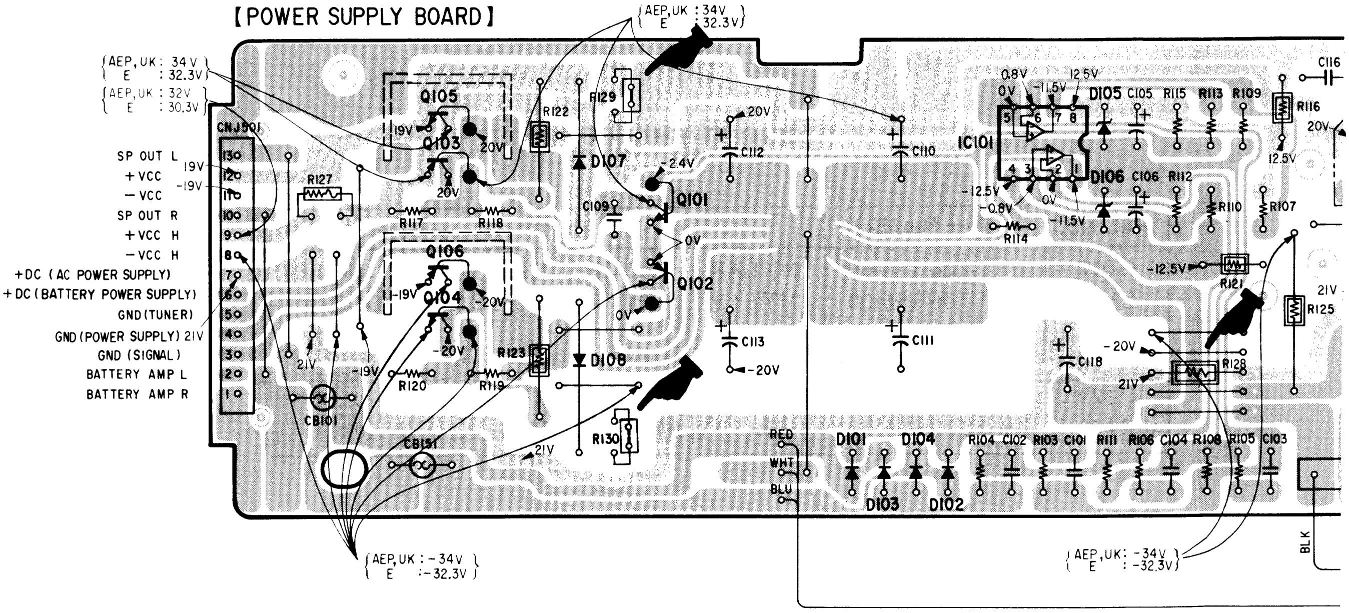
SONY
SERVICE MANUAL

AEP, UK MODEL
SERIAL NUMBER 720,001 AND LATER

MOUNTING DIAGRAM

Page: AC-7, 8

☛ : changed portion

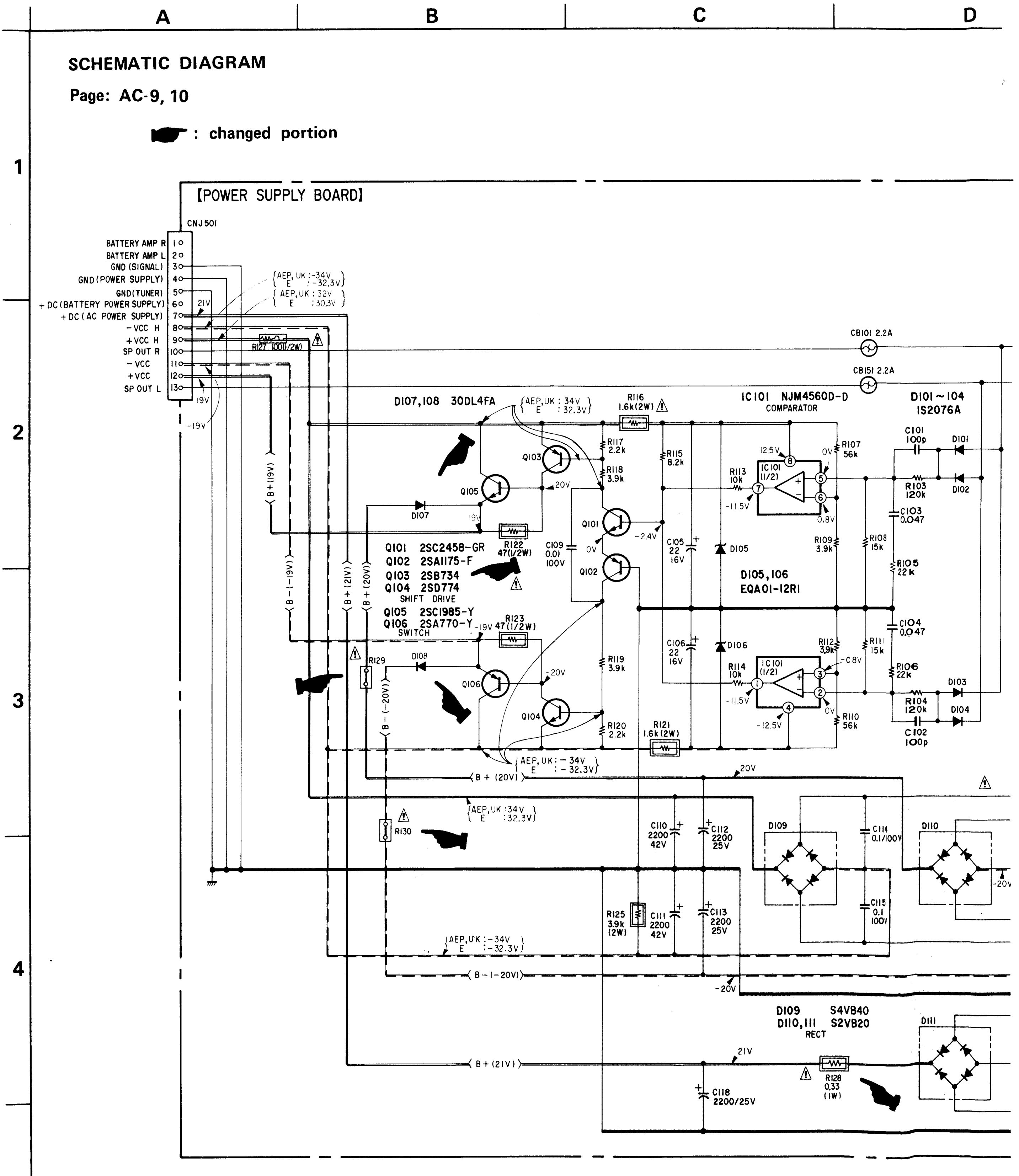

[POWER SUPPLY BOARD]
AEP, UK : 34V
E : 32.3V
AEP, UK : 32V
E : 30.3V
CNJ501
SP OUT L
+VCC
−VCC
SP OUT R
+VCC H
−VCC H
+DC (AC POWER SUPPLY)
+DC (BATTERY POWER SUPPLY)
GND (TUNER)
GND (POWER SUPPLY) 21V
GND (SIGNAL)
BATTERY AMP L
BATTERY AMP R
19V
-19V
Q105
Q103
Q106
Q104
20V
-20V
R127
R117
R118
R120
R119
R122
R123
R129
R130
D107
D108
C109
Q101
Q102
-2.4V
0V
C112
C113
C110
C111
IC101
0.8V
-11.5V
12.5V
-12.5V
-0.8V
R114
D105
D106
C105
C106
R115
R113
R109
R112
R110
R116
R107
R121
R125
R128
C116
C118
21V
CB101
CB151
RED
WHT
BLU
D101
D104
D103
D102
R104
C102
R103
C101
R111
R106
C104
R108
R105
C103
BLK
AEP, UK : -34V
E : -32.3V

IC · Q	105 103 106 104	101 102		IC101
D		107 108	101 103 104 102	105 106

SCHEMATIC DIAGRAM

Page: AC-9, 10

☛ : **changed portion**


A
B
C
D
1
2
3
4
[POWER SUPPLY BOARD]
CNJ501
BATTERY AMP R 1
BATTERY AMP L 2
GND (SIGNAL) 3
GND (POWER SUPPLY) 4
GND (TUNER) 5
+DC (BATTERY POWER SUPPLY) 6
+DC (AC POWER SUPPLY) 7
-VCC H 8
+VCC H 9
SP OUT R 10
-VCC 11
+VCC 12
SP OUT L 13
21V
19V
-19V
AEP, UK : -34V
E : -32.3V
AEP, UK : 32V
E : 30.3V
R127 100(1/2W)
CB101 2.2A
CB151 2.2A
D107,108 30DL4FA
AEP, UK : 34V
E : 32.3V
R116 1.6k(2W)
IC101 NJM4560D-D
COMPARATOR
D101~104
1S2076A
Q103
R117 2.2k
R118 3.9k
R115 8.2k
12.5V
0V
R107 56k
C101 100p
D101
R113 10k
IC101 (1/2)
-11.5V
0.8V
R103 120k
D102
C103 0.047
Q105
-20V
D107
19V
Q101
-2.4V
R122 47(1/2W)
C109 0.01 100V
0V
C105 22 16V
D105
R109 3.9k
R108 15k
R105 22k
Q101 2SC2458-GR
Q102 2SA1175-F
Q103 2SB734
Q104 2SD774
SHIFT DRIVE
Q105 2SC1985-Y
Q106 2SA770-Y
SWITCH
Q102
D105,106
EQA01-12R1
B+(19V)
B-(-19V)
B+(21V)
B+(20V)
-19V
R123 47(1/2W)
C104 0.047
R129
D108
C106 22 16V
D106
R112 3.9k
-0.8V
R111 15k
R119 3.9k
R114 10k
R106 22k
Q106
-20V
B-(-20V)
-11.5V
0V
D103
R104 120k
D104
Q104
R120 2.2k
R121 1.6k(2W)
-12.5V
R110 56k
C102 100p
AEP, UK : -34V
E : -32.3V
B+(20V)
20V
AEP, UK : 34V
E : 32.3V
R130
C110 2200 42V
C112 2200 25V
D109
C114 0.1/100V
D110
-20V
R125 3.9k (2W)
C111 2200 42V
C113 2200 25V
C115 0.1 100V
AEP, UK : -34V
E : -32.3V
B-(-20V)
-20V
D109 S4VB40
D110,111 S2VB20
RECT
D111
B+(21V)
21V
R128 0.33 (1W)
C118 2200/25V

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

Sony Corporation
Consumer Products Group
Technical Support Dept.

9-950-987-81

English
83E0405-2
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STEREO CASSETTE DECK
(TC-78)

FH-7
TC-78

AEP Model
UK Model
E Model

SUPPLEMENT

File this supplement with the service manual.

No. 2
February, 1983

SYSTEM CONTROL CIRCUIT AND MECHANISM CHANGE

- **Applicable Serial No.:**

AEP Model:	503,301 and later
UK Model:	609,501 and later
E1 Model:	322,901 and later
E2 Model:	405,401 and later

- **System control circuit and board have been changed.**
- **Tape transport mechanism type has been changed.**

Former		New
TCM-130R2	➡	TCM-130AR2

- **Owing to these changes, pause mechanism can be operated when tape is played back even in reverse mode.**

MICROFILM

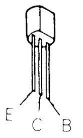
SONY®
SERVICE MANUAL

FH-7
TC-78

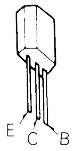
Applicable Serial No.:
AEP Model: 503,301 and later
UK Model: 609,501 and later
E1 Model: 322,901 and later
E2 Model: 405,401 and later

SEMICONDUCTOR LEAD LAYOUTS

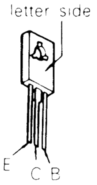
2SA1015
2SC1345
2SC1364
2SC2001



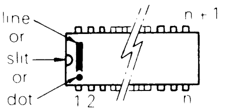
2SA1027R
2SA1175
2SC2785



2SD809

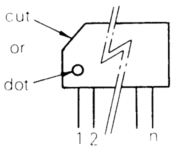

letter side
E
C
B

CX174A
MB84069UB
TC9310N-013
μPD4011C

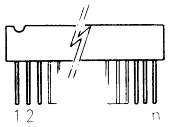

line
or
slit
or
dot
n + 1
1 2
n

(Top view)

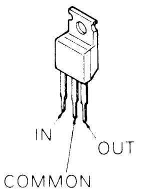
LB1403
NJM4558S


cut
or
dot
1 2
n

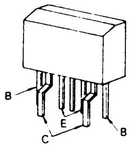
BA328



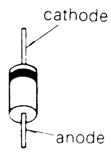
NJM78M05A


IN
OUT
COMMON

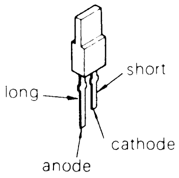
μPA74V-FA



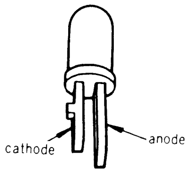
10E2
1S1555
HZ6B1L


cathode
anode

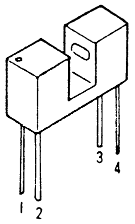
SLP251B

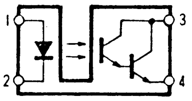

short
long
cathode
anode

SLR34DC5
SLR34PC5
SLR34URC5

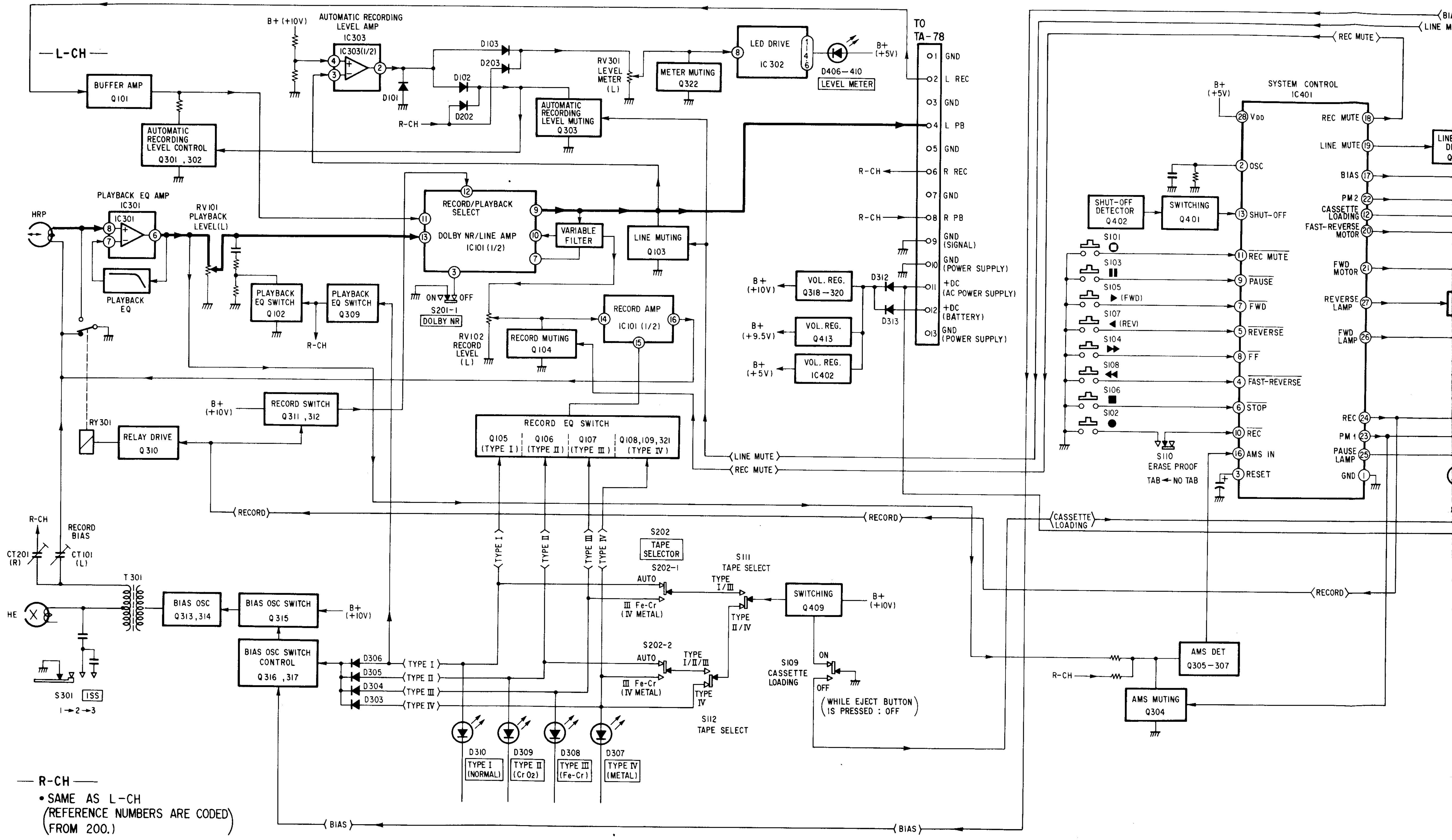

cathode
anode

SPI201

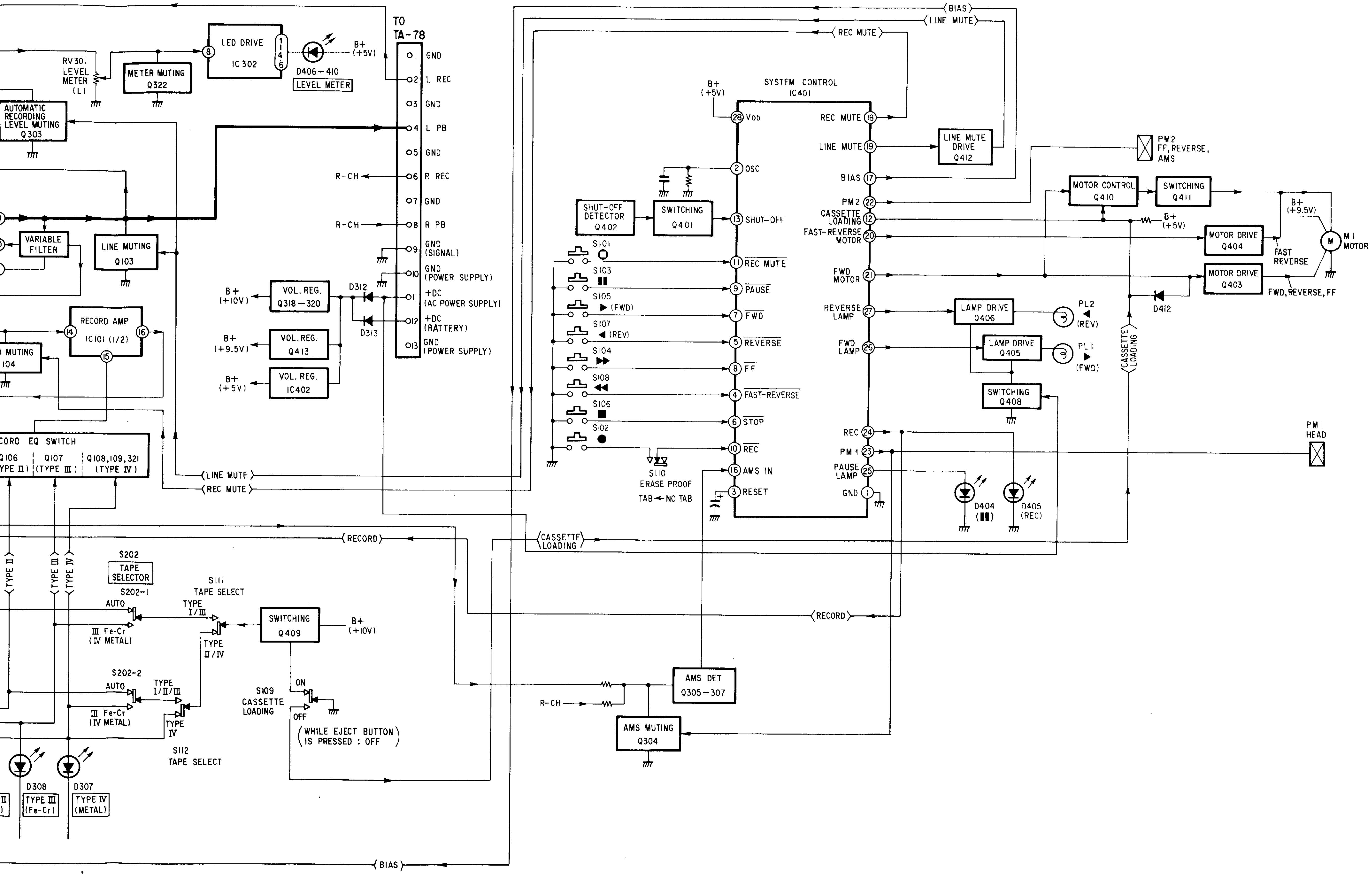




BLOCK DIAGRAM

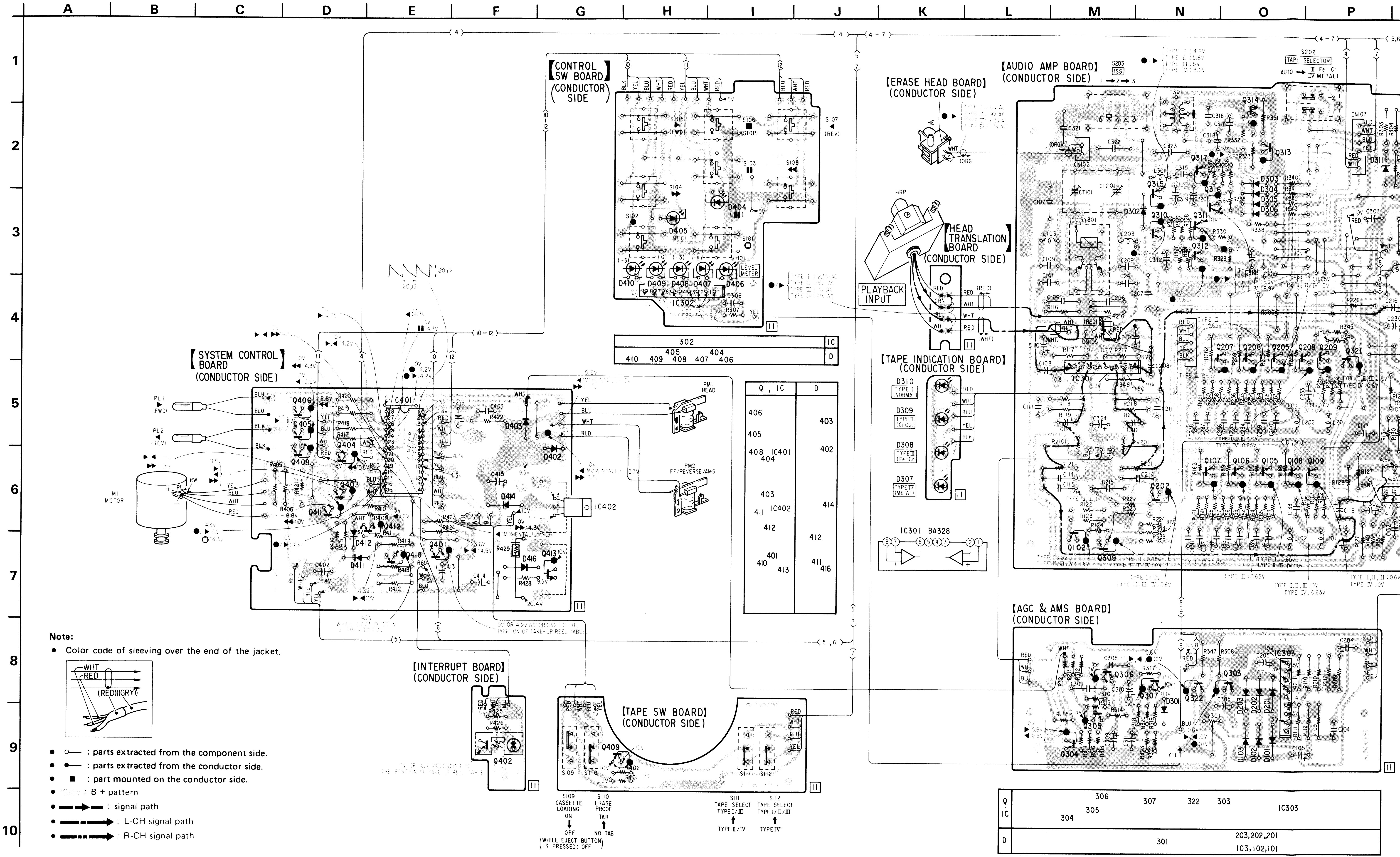

— L-CH —
B+ (+10V)
AUTOMATIC RECORDING LEVEL AMP IC303
IC303(1/2)
D103
D203
D102
D202
D101
R-CH
LED DRIVE IC302
D406–410
LEVEL METER
B+ (+5V)
RV301 LEVEL METER (L)
METER MUTING Q322
AUTOMATIC RECORDING LEVEL MUTING Q303
BUFFER AMP Q101
AUTOMATIC RECORDING LEVEL CONTROL Q301, 302
TO TA-78
1 GND
2 L REC
3 GND
4 L PB
5 GND
6 R REC
7 GND
8 R PB
9 GND (SIGNAL)
10 GND (POWER SUPPLY)
11 +DC (AC POWER SUPPLY)
12 +DC (BATTERY)
13 GND (POWER SUPPLY)
PLAYBACK EQ AMP IC301
HRP
PLAYBACK EQ
RV101 PLAYBACK LEVEL(L)
RECORD/PLAYBACK SELECT
DOLBY NR/LINE AMP IC101 (1/2)
VARIABLE FILTER
LINE MUTING Q103
ON OFF
S201-1
DOLBY NR
PLAYBACK EQ SWITCH Q102
PLAYBACK EQ SWITCH Q309
RV102 RECORD LEVEL (L)
RECORD MUTING Q104
RECORD AMP IC101 (1/2)
B+ (+10V)
VOL. REG. Q318–320
B+ (+9.5V)
VOL. REG. Q413
B+ (+5V)
VOL. REG. IC402
D312
D313
RY301
RELAY DRIVE Q310
RECORD SWITCH Q311, 312
RECORD EQ SWITCH
Q105 (TYPE I)
Q106 (TYPE II)
Q107 (TYPE III)
Q108,109,321 (TYPE IV)
LINE MUTE
REC MUTE
RECORD
R-CH
RECORD BIAS
CT201 (R)
CT101 (L)
T301
HE
BIAS OSC Q313,314
BIAS OSC SWITCH Q315
BIAS OSC SWITCH CONTROL Q316, 317
S301 ISS
1→2→3
D306 D305 D304 D303
TYPE I
TYPE II
TYPE III
TYPE IV
S202 TAPE SELECTOR
S202-1
AUTO
III Fe-Cr (IV METAL)
S202-2
S111 TAPE SELECT
TYPE I/III
TYPE II/IV
TYPE I/II/III
TYPE IV
S112 TAPE SELECT
SWITCHING Q409
S109 CASSETTE LOADING
ON OFF
(WHILE EJECT BUTTON IS PRESSED : OFF)
D310 TYPE I (NORMAL)
D309 TYPE II (CrO2)
D308 TYPE III (Fe-Cr)
D307 TYPE IV (METAL)
BIAS
LINE MUTE
SYSTEM CONTROL IC401
B+ (+5V)
28 VDD
2 OSC
13 SHUT-OFF
11 REC MUTE
9 PAUSE
7 FWD
5 REVERSE
8 FF
4 FAST-REVERSE
6 STOP
10 REC
16 AMS IN
3 RESET
18 REC MUTE
19 LINE MUTE
17 BIAS
22 PM2
12 CASSETTE LOADING
20 FAST-REVERSE MOTOR
21 FWD MOTOR
27 REVERSE LAMP
26 FWD LAMP
24 REC
23 PM1
25 PAUSE LAMP
1 GND
SHUT-OFF DETECTOR Q402
SWITCHING Q401
S101 S103 S105 (FWD) S107 (REV) S104 S108 S106 S102
S110 ERASE PROOF
TAB ← NO TAB
CASSETTE LOADING
AMS DET Q305–307
AMS MUTING Q304

— R-CH —
- SAME AS L-CH
(REFERENCE NUMBERS ARE CODED FROM 200.)


TO TA-78
GND
L REC
L PB
R REC
R PB
GND (SIGNAL)
GND (POWER SUPPLY)
+DC (AC POWER SUPPLY)
+DC (BATTERY)
GND (POWER SUPPLY)
R-CH
LED DRIVE
IC302
B+ (+5V)
D406—410
LEVEL METER
RV301 LEVEL METER (L)
METER MUTING Q322
AUTOMATIC RECORDING LEVEL MUTING Q303
VARIABLE FILTER
LINE MUTING Q103
RECORD AMP IC101 (1/2)
MUTING Q104
RECORD EQ SWITCH
Q106 (TYPE II)
Q107 (TYPE III)
Q108,109,321 (TYPE IV)
LINE MUTE
REC MUTE
BIAS
RECORD
CASSETTE LOADING
VOL. REG. Q318—320
VOL. REG. Q413
VOL. REG. IC402
B+ (+10V)
B+ (+9.5V)
B+ (+5V)
D312
D313
SYSTEM CONTROL IC401
VDD
OSC
SHUT-OFF
REC MUTE
PAUSE
FWD
REVERSE
FF
FAST-REVERSE
STOP
REC
AMS IN
RESET
LINE MUTE
BIAS
PM2
CASSETTE LOADING
FAST-REVERSE MOTOR
FWD MOTOR
REVERSE LAMP
FWD LAMP
PM1
PAUSE LAMP
GND
SHUT-OFF DETECTOR Q402
SWITCHING Q401
S101
S103
S105 ▶ (FWD)
S107 ◀ (REV)
S104 ▶▶
S108 ◀◀
S106 ■
S102 ●
S110 ERASE PROOF
TAB ← NO TAB
LINE MUTE DRIVE Q412
PM2 FF, REVERSE, AMS
MOTOR CONTROL Q410
SWITCHING Q411
B+ (+9.5V)
B+ (+5V)
MOTOR DRIVE Q404
MOTOR DRIVE Q403
FAST REVERSE
FWD, REVERSE, FF
M1 MOTOR
D412
LAMP DRIVE Q406
LAMP DRIVE Q405
PL2 ◀ (REV)
PL1 ▶ (FWD)
SWITCHING Q408
D404 (❚❚)
D405 (REC)
PM1 HEAD
S202 TAPE SELECTOR
S202-1 AUTO
III Fe-Cr (IV METAL)
S202-2 AUTO
S111 TAPE SELECT
TYPE I/III
TYPE II/IV
TYPE I/II/III
TYPE IV
S112 TAPE SELECT
SWITCHING Q409
B+ (+10V)
S109 CASSETTE LOADING
ON
OFF
(WHILE EJECT BUTTON IS PRESSED : OFF)
AMS DET Q305—307
AMS MUTING Q304
TYPE II
TYPE III
TYPE IV
D308 TYPE III (Fe-Cr)
D307 TYPE IV (METAL)

MOUNTING DIAGRAM

- See page TC-2 for Semiconductor Lead Layouts.


A B C D E F G H I J K L M N O P
1 2 3 4 5 6 7 8 9 10
【CONTROL SW BOARD】 (CONDUCTOR SIDE)
S105 (FWD)
S106 (STOP)
S107 (REV)
S103
S108
S104
S102
S101
D404
D405 (REC)
D410 D409-D408-D407 D406
LEVEL METER
IC302
【SYSTEM CONTROL BOARD】 (CONDUCTOR SIDE)
PL1 (FWD)
PL2 (REV)
M1 MOTOR
IC401
IC402
Q401 Q403 Q404 Q405 Q406 Q408 Q410 Q411 Q412 Q413
D402 D403 D411 D412 D414 D416
PM1 HEAD
PM2 FF/REVERSE/AMS
0V OR 4.2V ACCORDING TO THE POSITION OF TAKE-UP REEL TABLE
【INTERRUPT BOARD】 (CONDUCTOR SIDE)
Q402
【TAPE SW BOARD】 (CONDUCTOR SIDE)
S109 CASSETTE LOADING ON OFF (WHILE EJECT BUTTON IS PRESSED: OFF)
S110 ERASE PROOF TAB NO TAB
S111 TAPE SELECT TYPE I/III TYPE II/IV
S112 TAPE SELECT TYPE I/II/III TYPE IV
Q409
【ERASE HEAD BOARD】 (CONDUCTOR SIDE)
HE
HRP
【HEAD TRANSLATION BOARD】 (CONDUCTOR SIDE)
PLAYBACK INPUT
【TAPE INDICATION BOARD】 (CONDUCTOR SIDE)
D310 TYPE I (NORMAL)
D309 TYPE II (CrO2)
D308 TYPE III (Fe-Cr)
D307 TYPE IV (METAL)
IC301 BA328
【AUDIO AMP BOARD】 (CONDUCTOR SIDE)
S203 ISS
S202 TAPE SELECTOR AUTO → III Fe-Cr (IV METAL)
IC301
【AGC & AMS BOARD】 (CONDUCTOR SIDE)
IC303
SONY

302	IC
405 404 410 409 408 407 406	D

Q , IC	D
406	403
405	402
408 IC401 404	
403	414
411 IC402	
412	412
401 410 413	411 416

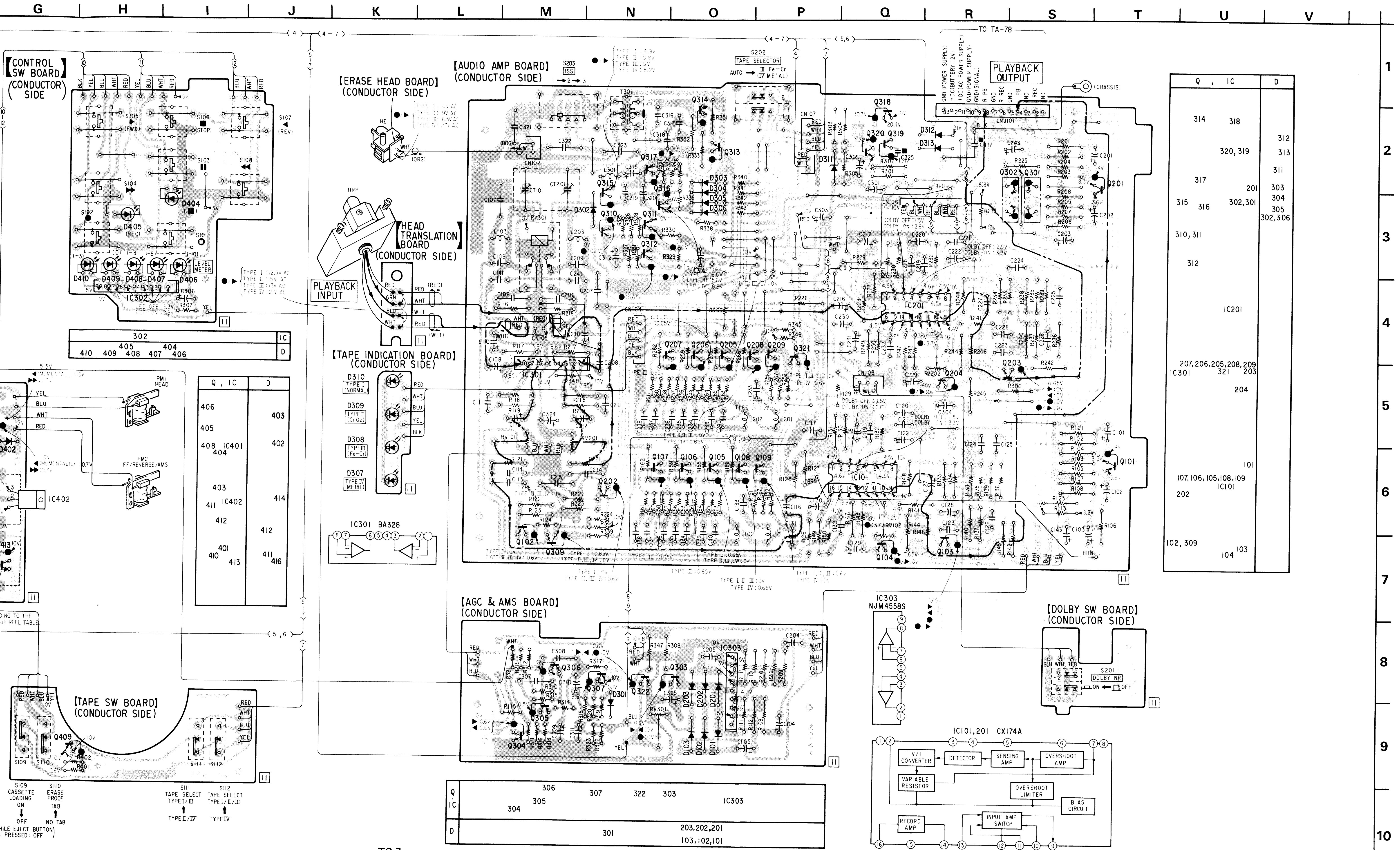
Q IC	306 305 304 307 322 303 IC303
D	301 203,202,201 103,102,101

Note:

- Color code of sleeving over the end of the jacket.

WHT
RED
(RED)((GRY))

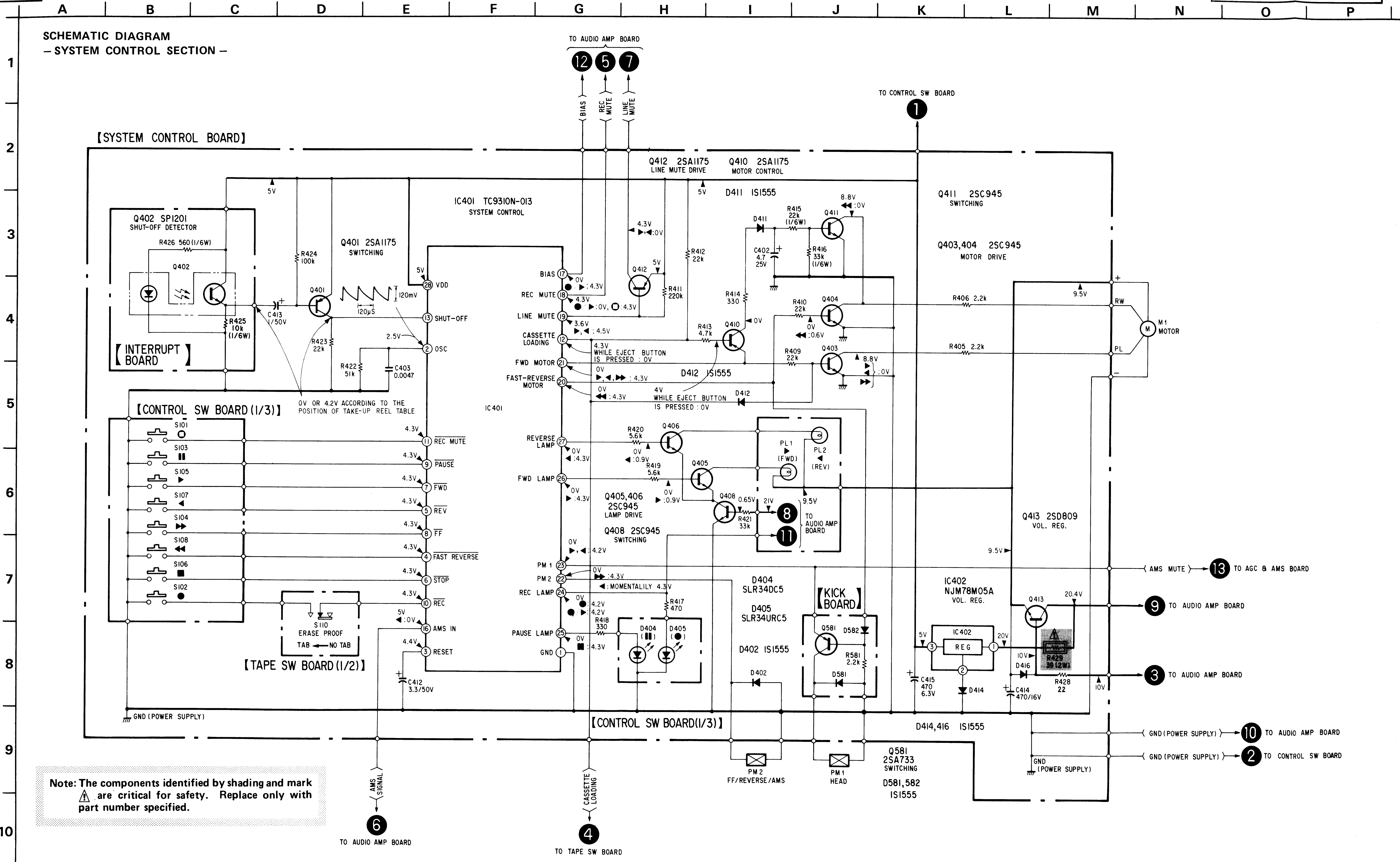
- ○— : parts extracted from the component side.
- ●— : parts extracted from the conductor side.
- ■ : part mounted on the conductor side.
- ▨ : B + pattern
- ━ ➡ ━ : signal path
- ━━ ▪ ━━➡ : L-CH signal path
- ━━ ▪▪ ━━➡ : R-CH signal path


G H I J K L M N O P Q R S T U V
1 2 3 4 5 6 7 8 9 10
【CONTROL SW BOARD】 (CONDUCTOR SIDE)
S105 (FWD)
S106 (STOP)
S107 (REV)
S103
S108
S104
S102
D404
D405 (REC)
S101
LEVEL METER
D410 D409 D408 D407 D406
IC302
【ERASE HEAD BOARD】 (CONDUCTOR SIDE)
HE
HRP
【HEAD TRANSLATION BOARD】 (CONDUCTOR SIDE)
PLAYBACK INPUT
【AUDIO AMP BOARD】 (CONDUCTOR SIDE)
S203 ISS
S202 TAPE SELECTOR
AUTO → III Fe-Cr (IV METAL)
TO TA-78
PLAYBACK OUTPUT
GND (POWER SUPPLY)
+DC (BATTERY) (12V)
+DC (AC POWER SUPPLY)
GND (SIGNAL)
R PB
R REC
L PB
L REC
(CHASSIS)
CNJ101
IC201
IC301
IC101
【TAPE INDICATION BOARD】 (CONDUCTOR SIDE)
D310 TYPE I (NORMAL)
D309 TYPE II (CrO2)
D308 TYPE III (Fe-Cr)
D307 TYPE IV (METAL)
IC301 BA328
PM1 HEAD
PM2 FF/REVERSE/AMS
IC402
【AGC & AMS BOARD】 (CONDUCTOR SIDE)
IC303
IC303 NJM4558S
【DOLBY SW BOARD】 (CONDUCTOR SIDE)
S201 DOLBY NR
ON OFF
【TAPE SW BOARD】 (CONDUCTOR SIDE)
Q409
S109 S110 S111 S112
S109 CASSETTE LOADING ON ↓ OFF
S110 ERASE PROOF TAB ↑ NO TAB
S111 TAPE SELECT TYPE I/III ↑ TYPE II/IV
S112 TAPE SELECT TYPE I/II/III ↑ TYPE IV
(WHILE EJECT BUTTON PRESSED: OFF)
IC101, 201 CX174A
V/I CONVERTER
DETECTOR
SENSING AMP
OVERSHOOT AMP
VARIABLE RESISTOR
OVERSHOOT LIMITER
BIAS CIRCUIT
RECORD AMP
INPUT AMP SWITCH
Q , IC | D
302 | IC
405 404 410 409 408 407 406 | D
406 405 408 IC401 404 403 411 IC402 412 401 410 413 | 403 402 414 412 411 416
314 318 320, 319 317 201 315 316 302, 301 310, 311 312 IC201 207, 206, 205, 208, 209 IC301 321 203 204 101 107, 106, 105, 108, 109 IC101 202 102, 309 104 103 | 312 313 311 303 304 305 302, 306
Q IC 306 307 322 303 305 304 IC303 | D 301 203, 202, 201 103, 102, 101

Applicable Serial No.:
AEP Model: 503,301 and later E1 Model: 322,901 and later
UK Model: 609,501 and later E2 Model: 405,401 and later

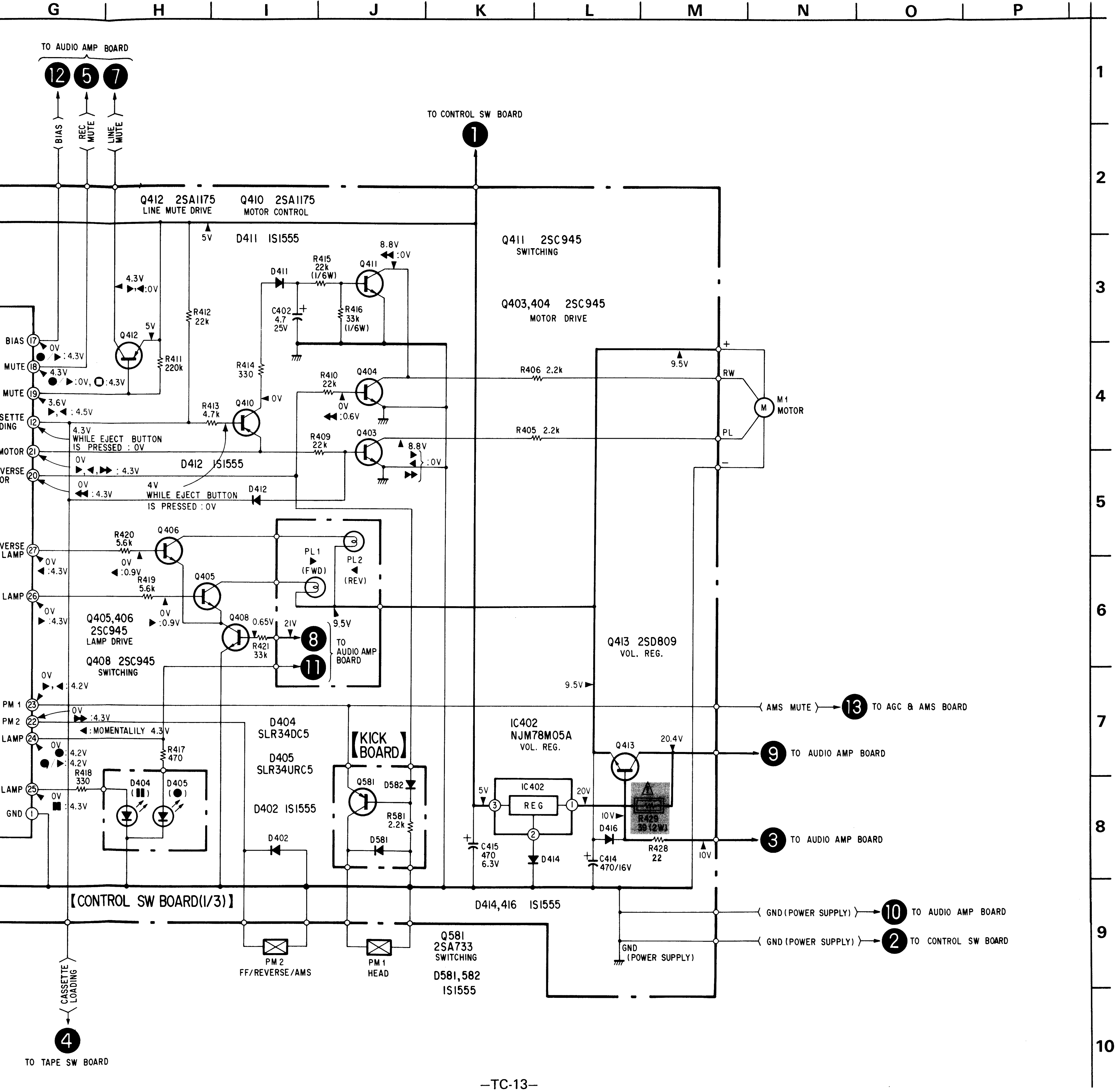
FH-7 **FH-7**
TC-78 **TC-78**

SCHEMATIC DIAGRAM
– SYSTEM CONTROL SECTION –


A B C D E F G H I J K L M N O P
1 2 3 4 5 6 7 8 9 10
TO AUDIO AMP BOARD
⑫ ⑤ ⑦
BIAS
REC MUTE
LINE MUTE
TO CONTROL SW BOARD
①
[SYSTEM CONTROL BOARD]
Q412 2SA1175 LINE MUTE DRIVE
Q410 2SA1175 MOTOR CONTROL
D411 1S1555
Q411 2SC945 SWITCHING
Q403,404 2SC945 MOTOR DRIVE
IC401 TC9310N-013 SYSTEM CONTROL
Q402 SP1201 SHUT-OFF DETECTOR
R426 560(1/6W)
Q401 2SA1175 SWITCHING
R424 100k
120mV
120μS
C413 1/50V
R425 10k (1/6W)
R423 22k
R422 51k
C403 0.0047
[INTERRUPT BOARD]
0V OR 4.2V ACCORDING TO THE POSITION OF TAKE-UP REEL TABLE
5V VDD
SHUT-OFF
2.5V OSC
BIAS
REC MUTE
LINE MUTE
CASSETTE LOADING
FWD MOTOR
FAST-REVERSE MOTOR
4.3V WHILE EJECT BUTTON IS PRESSED : 0V
4V WHILE EJECT BUTTON IS PRESSED : 0V
D412 1S1555
R412 22k
R411 220k
R415 22k (1/6W)
R416 33k (1/6W)
C402 4.7 25V
R414 330
R413 4.7k
R410 22k
R409 22k
R406 2.2k
R405 2.2k
8.8V
9.5V
RW PL
M1 MOTOR
[CONTROL SW BOARD(1/3)]
S101 S103 S105 S107 S104 S108 S106 S102
REC MUTE
PAUSE
FWD
REV
FF
FAST REVERSE
STOP
REC
AMS IN
RESET
S110 ERASE PROOF
TAB ← NO TAB
[TAPE SW BOARD(1/2)]
C412 3.3/50V
IC401
REVERSE LAMP
FWD LAMP
R420 5.6k
R419 5.6k
Q406 Q405 Q408
Q405,406 2SC945 LAMP DRIVE
Q408 2SC945 SWITCHING
R421 33k
PL1 (FWD)
PL2 (REV)
21V
9.5V
⑧ ⑪
TO AUDIO AMP BOARD
PM 1
PM 2
REC LAMP
PAUSE LAMP
GND
MOMENTALILY 4.3V
R417 470
R418 330
D404 D405
D404 SLR34DC5
D405 SLR34URC5
D402 1S1555
[KICK BOARD]
Q581
D582
R581 2.2k
D581
Q413 2SD809 VOL. REG.
IC402 NJM78M05A VOL. REG.
IC402 REG
C415 470 6.3V
D414
D416
C414 470/16V
R429 39 (2W)
R428 22
20.4V
20V
10V
AMS MUTE
⑬ TO AGC & AMS BOARD
⑨ TO AUDIO AMP BOARD
③ TO AUDIO AMP BOARD
D414,416 1S1555
GND (POWER SUPPLY)
⑩ TO AUDIO AMP BOARD
② TO CONTROL SW BOARD
GND (POWER SUPPLY)
[CONTROL SW BOARD(1/3)]
PM 2 FF/REVERSE/AMS
PM 1 HEAD
Q581 2SA733 SWITCHING
D581,582 1S1555
AMS SIGNAL
⑥ TO AUDIO AMP BOARD
CASSETTE LOADING
④ TO TAPE SW BOARD

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

Applicable Serial No.:
AEP Model: 503,301 and later E1 Model: 322,901 and later
UK Model: 609,501 and later E2 Model: 405,401 and later


G
H
I
J
K
L
M
N
O
P
1
2
3
4
5
6
7
8
9
10
TO AUDIO AMP BOARD
⓬ ❺ ❼
BIAS
REC MUTE
LINE MUTE
TO CONTROL SW BOARD
❶
Q412 2SA1175
LINE MUTE DRIVE
Q410 2SA1175
MOTOR CONTROL
5V
D411 1S1555
Q411 2SC945
SWITCHING
Q403,404 2SC945
MOTOR DRIVE
R415 22k (1/6W)
8.8V
◀◀:0V
D411
C402 4.7 25V
R416 33k (1/6W)
4.3V
▶,◀:0V
R412 22k
5V
R411 220k
BIAS ⑰
0V
●/▶:4.3V
MUTE ⑱
4.3V
●/▶:0V, O:4.3V
MUTE ⑲
3.6V
▶,◀:4.5V
SETTE DING ⑫
4.3V WHILE EJECT BUTTON IS PRESSED : 0V
MOTOR ㉑
0V ▶,◀,▶▶ : 4.3V
VERSE OR ⑳
0V ◀◀:4.3V
4V WHILE EJECT BUTTON IS PRESSED : 0V
D412 1S1555
D412
R414 330
R413 4.7k
Q410
◀0V
R410 22k
0V ◀◀:0.6V
Q404
R409 22k
Q403
8.8V
▶:0V ◀
▶▶
R406 2.2k
R405 2.2k
9.5V
+
RW
PL
−
M
M1 MOTOR
VERSE LAMP ㉗
0V ◀:4.3V
R420 5.6k
Q406
0V ◀:0.9V
R419 5.6k
Q405
LAMP ㉖
0V ▶:4.3V
0V ▶:0.9V
Q405,406 2SC945
LAMP DRIVE
Q408 2SC945
SWITCHING
Q408
0.65V
R421 33k
21V
❽
⓫
9.5V
TO AUDIO AMP BOARD
PL1 ▶ (FWD)
PL2 ◀ (REV)
Q413 2SD809
VOL. REG.
0V ▶,◀:4.2V
PM 1 ㉓
PM 2 ㉒
0V ▶▶:4.3V
◀: MOMENTALILY 4.3V
LAMP ㉔
0V ●:4.2V ●/▶:4.2V
R417 470
R418 330
LAMP ㉕
0V ■:4.3V
GND ①
D404 (II)
D405 (●)
D404 SLR34DC5
D405 SLR34URC5
D402 1S1555
D402
【KICK BOARD】
Q581
D582
R581 2.2k
D581
IC402 NJM78M05A
VOL. REG.
5V
IC402
REG
20V
③ ② ①
C415 470 6.3V
D414
C414 470/16V
10V▶
D416
R429 39 (2W)
R428 22
10V
Q413
20.4V
9.5V▶
AMS MUTE
⓭ TO AGC & AMS BOARD
❾ TO AUDIO AMP BOARD
❸ TO AUDIO AMP BOARD
【CONTROL SW BOARD(1/3)】
D414,416 1S1555
GND (POWER SUPPLY)
❿ TO AUDIO AMP BOARD
GND (POWER SUPPLY)
❷ TO CONTROL SW BOARD
GND (POWER SUPPLY)
Q581 2SA733 SWITCHING
D581,582 1S1555
PM2 FF/REVERSE/AMS
PM1 HEAD
CASSETTE LOADING
❹
TO TAPE SW BOARD

NOTE FOR SCHEMATIC DIAGRAM
− Audio Amp Section −

Note:

- Components for right channel have same values as for left channel. Reference numbers are coded from 200.
- All capacitors are in μF unless otherwise noted. pF : μμF 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in ohms, ¼W unless otherwise noted. kΩ : 1000Ω, MΩ : 1000kΩ
- ☐ : adjustment for repair.
- ——— : B+ bus.
- Readings are taken under no-signal conditions.

No mark : STOP
▶ : FWD
◀ : REV
▶▶ : FF
◀◀ : FAST-REVERSE
● : REC
●/▶ : REC FWD
O : REC MUTE
II : PAUSE

- ➡ : signal path
- Switch

Ref. No.	Switch	Position
S109	CASSETTE LOADING	ON
S111	TAPE SELECTOR	TYPE II/IV
S112	TAPE SELECTOR	TYPE IV
S201	DOLBY NR	OFF
S202	TAPE SELECTOR	AUTO
S203	ISS	1

− System Control Section −

Note:

- All capacitors are in μF unless otherwise noted. pF : μμF 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in ohms, ¼W unless otherwise noted. kΩ : 1000Ω, MΩ : 1000kΩ
- ▭ : nonflammable resistor.
- ——— : B+ bus.
- Readings are taken under no-signal conditions.

No mark : STOP
▶ : FWD
◀ : REV
▶▶ : FF
◀◀ : FAST-REVERSE
● : REC
●/▶ : REC FWD
O : REC MUTE
II : PAUSE

- Switch

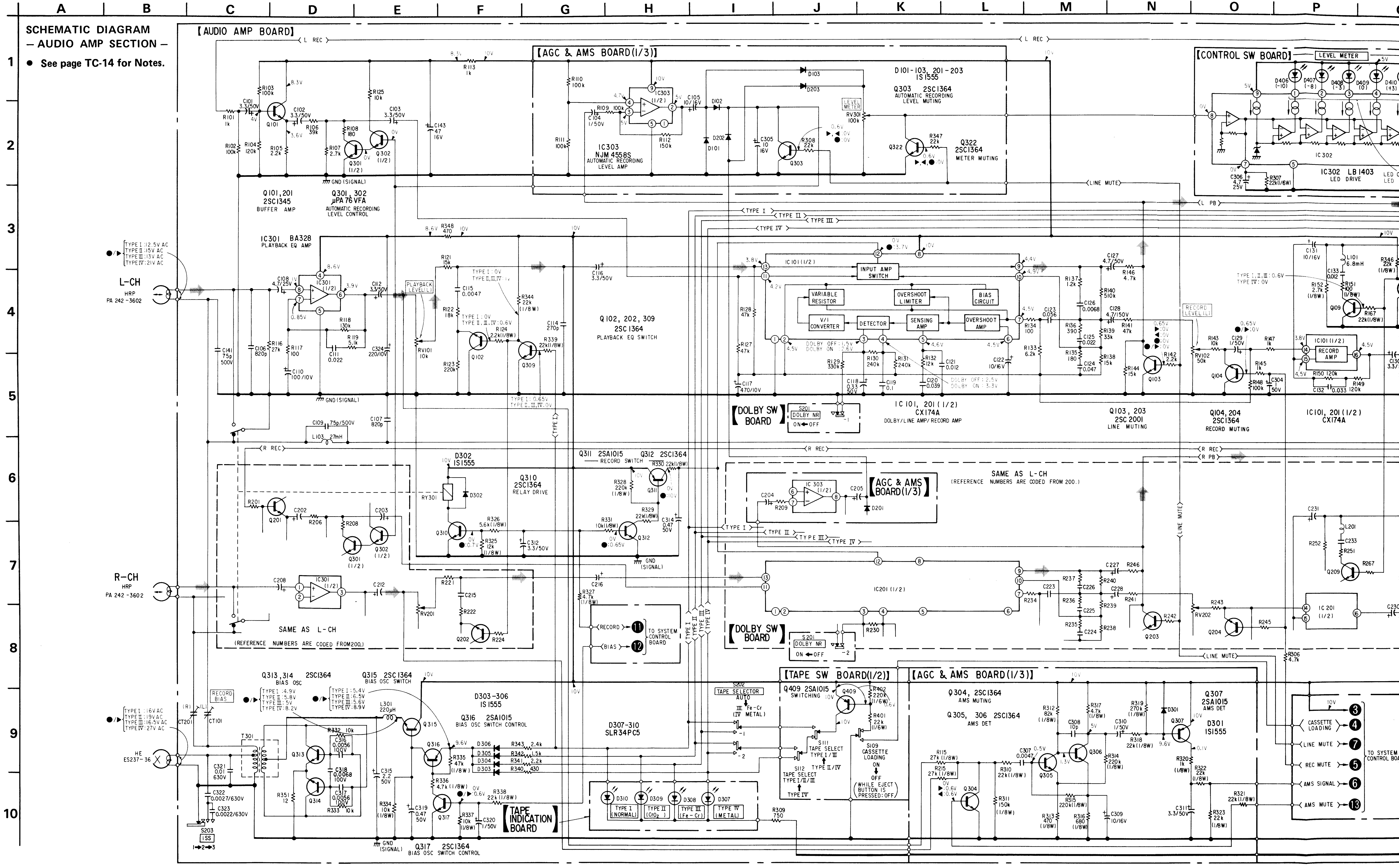
Ref. No.	Switch	Position
S101	O (REC MUTE)	OFF
S102	● (REC)	OFF
S103	II (PAUSE)	OFF
S104	▶▶ (FF)	OFF
S105	▶ (FWD)	OFF
S106	■ (STOP)	OFF
S107	◀ (REV)	OFF
S108	◀◀ (FAST-REVERSE)	OFF
S110	ACCIDENTAL-ERASURE PREVENTION	NO TAB

Note: Voltages are measured with a VOM (50kΩ/V).

Applicable Serial No.:
AEP Model: 503,301 and later E1 Model: 322,901 and later
UK Model: 609,501 and later E2 Model: 405,401 and later

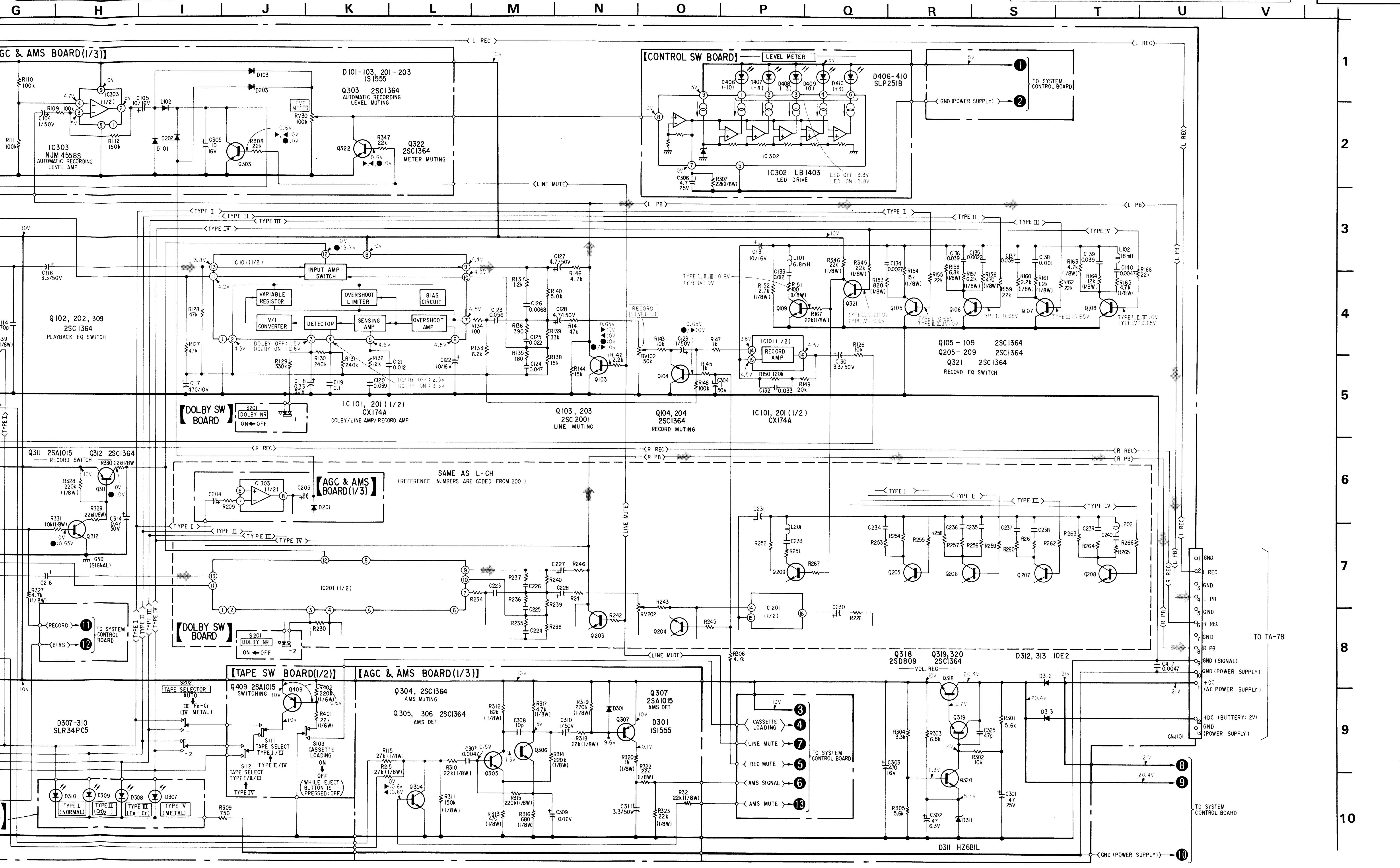
SCHEMATIC DIAGRAM — AUDIO AMP SECTION —

- See page TC-14 for Notes.


A B C D E F G H I J K L M N O P
1 2 3 4 5 6 7 8 9 10
【AUDIO AMP BOARD】
【AGC & AMS BOARD(1/3)】
【CONTROL SW BOARD】
LEVEL METER
L REC
R REC
L PB
R PB
LINE MUTE
TYPE I
TYPE II
TYPE III
TYPE IV
Q101, 201 2SC1345 BUFFER AMP
Q301, 302 μPA76VFA AUTOMATIC RECORDING LEVEL CONTROL
GND (SIGNAL)
IC303 NJM4558S AUTOMATIC RECORDING LEVEL AMP
D101-103, 201-203 1S1555
Q303 2SC1364 AUTOMATIC RECORDING LEVEL MUTING
Q322 2SC1364 METER MUTING
LEVEL METER
IC302 LB1403 LED DRIVE
IC301 BA328 PLAYBACK EQ AMP
PLAYBACK LEVEL(L)
Q102, 202, 309 2SC1364 PLAYBACK EQ SWITCH
INPUT AMP SWITCH
VARIABLE RESISTOR
OVERSHOOT LIMITER
BIAS CIRCUIT
V/I CONVERTER
DETECTOR
SENSING AMP
OVERSHOOT AMP
IC101 (1/2)
IC101, 201 (1/2) CX174A DOLBY/LINE AMP/RECORD AMP
DOLBY OFF: 1.5V DOLBY ON: 2.6V
DOLBY OFF: 2.5V DOLBY ON: 3.3V
【DOLBY SW BOARD】
S201 DOLBY NR ON ← OFF
Q103, 203 2SC2001 LINE MUTING
Q104, 204 2SC1364 RECORD MUTING
IC101, 201 (1/2) CX174A
RECORD LEVEL(L)
RECORD AMP
TYPE I: 12.5V AC TYPE II: 15V AC TYPE III: 13V AC TYPE IV: 21V AC
L-CH HRP PA 242-3602
R-CH HRP PA 242-3602
TYPE I: 0V TYPE II, III, IV: 0.6V
TYPE I: 0.65V TYPE II, III, IV: 0V
TYPE I, II, III: 0.6V TYPE IV: 0V
D302 1S1555
Q310 2SC1364 RELAY DRIVE
RY301
Q311 2SA1015 RECORD SWITCH
Q312 2SC1364
GND (SIGNAL)
SAME AS L-CH (REFERENCE NUMBERS ARE CODED FROM 200.)
【AGC & AMS BOARD(1/3)】
IC201 (1/2)
RECORD 11
BIAS 12
TO SYSTEM CONTROL BOARD
Q313, 314 2SC1364 BIAS OSC
Q315 2SC1364 BIAS OSC SWITCH
RECORD BIAS
TYPE I: 4.9V TYPE II: 5.8V TYPE III: 5V TYPE IV: 8.2V
TYPE I: 5.4V TYPE II: 6.5V TYPE III: 5.6V TYPE IV: 8.9V
TYPE I: 16V AC TYPE II: 19V AC TYPE III: 16.5V AC TYPE IV: 27V AC
HE ES237-36
T301
S203 ISS 1→2→3
D303-306 1S1555
Q316 2SA1015 BIAS OSC SWITCH CONTROL
Q317 2SC1364 BIAS OSC SWITCH CONTROL
D307-310 SLR34PC5
【TAPE INDICATION BOARD】
D310 TYPE I (NORMAL)
D309 TYPE II (CrO2)
D308 TYPE III (Fe-Cr)
D307 TYPE IV (METAL)
S202 TAPE SELECTOR AUTO III Fe-Cr (IV METAL)
【TAPE SW BOARD(1/2)】
Q409 2SA1015 SWITCHING
S111 TAPE SELECT TYPE I/III TYPE II/IV
S112 TAPE SELECT TYPE I/II/III TYPE IV
S109 CASSETTE LOADING ON ↓ OFF (WHILE EJECT BUTTON IS PRESSED: OFF)
Q304, 2SC1364 AMS MUTING
Q305, 306 2SC1364 AMS DET
Q307 2SA1015 AMS DET
D301 1S1555
CASSETTE LOADING 4
LINE MUTE 7
REC MUTE 5
AMS SIGNAL 6
AMS MUTE 13
10V 3
TO SYSTEM CONTROL BOARD

Applicable Serial No.:
AEP Model: 503,301 and later E1 Model: 322,901 and later
UK Model: 609,501 and later E2 Model: 405,401 and later

Note: Voltages are measured with a VOM (50kΩ/V).


G
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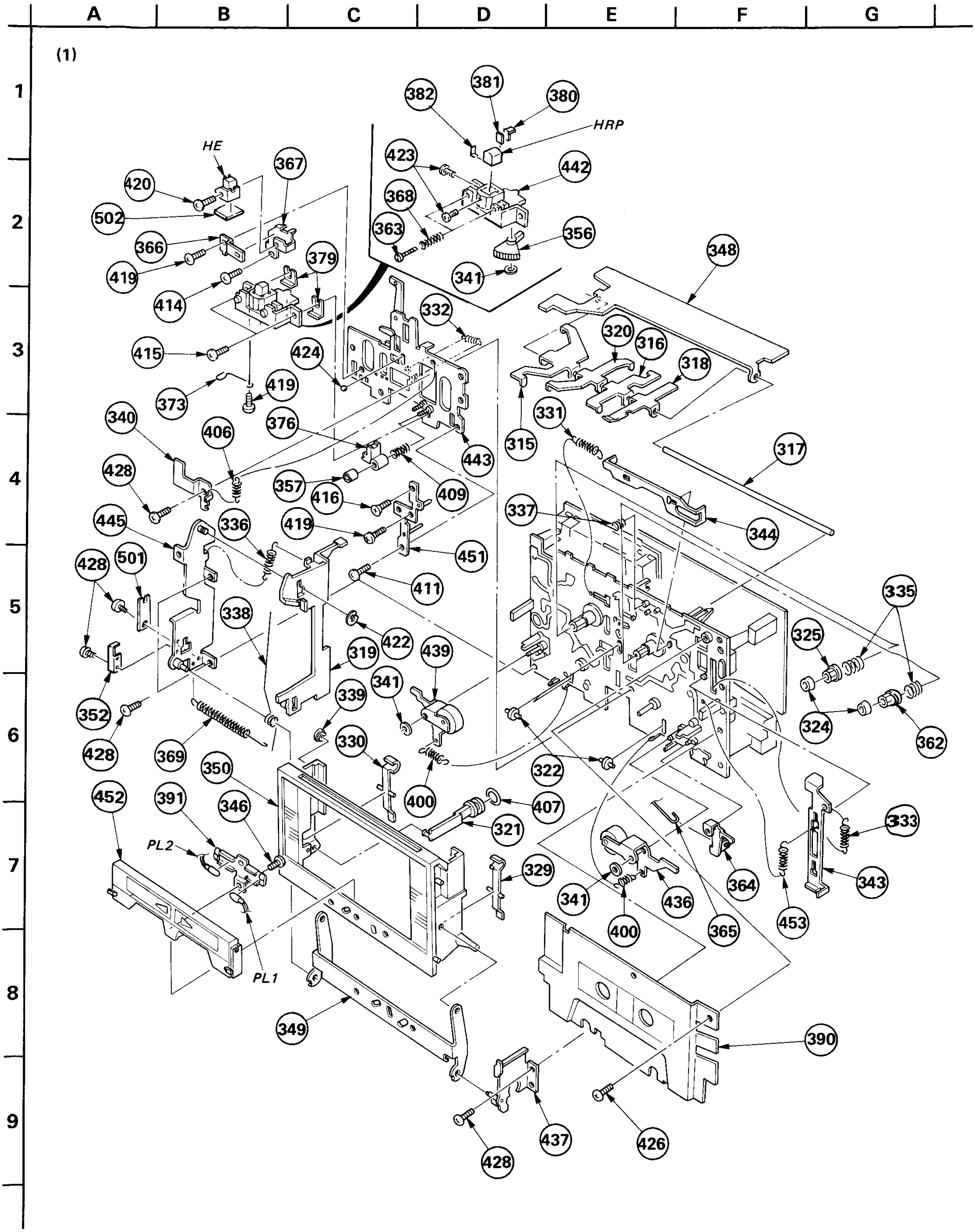
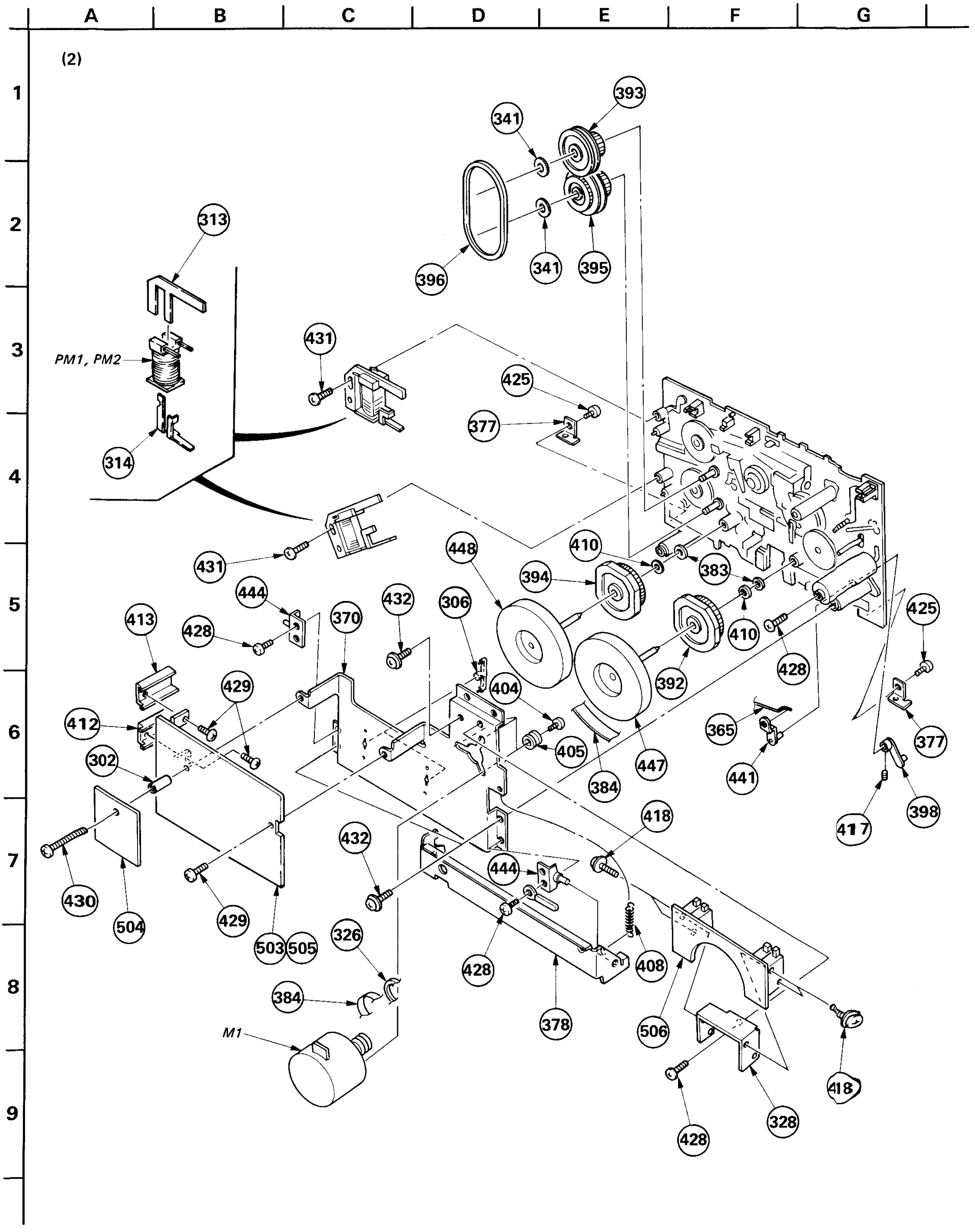
O
P
Q
R
S
T
U
V
1
2
3
4
5
6
7
8
9
10
AGC & AMS BOARD(1/3)
IC303 NJM4558S AUTOMATIC RECORDING LEVEL AMP
D101-103, 201-203 1S1555
Q303 2SC1364 AUTOMATIC RECORDING LEVEL MUTING
Q322 2SC1364 METER MUTING
LEVEL METER
RV301 100k
CONTROL SW BOARD
LEVEL METER
D406-410 SLP251B
IC302 LB1403 LED DRIVE
LED OFF: 3.3V
LED ON: 2.8V
TO SYSTEM CONTROL BOARD
GND (POWER SUPPLY)
L REC
LINE MUTE
L PB
TYPE I
TYPE II
TYPE III
TYPE IV
Q102, 202, 309 2SC1364 PLAYBACK EQ SWITCH
IC101 (1/2)
INPUT AMP SWITCH
VARIABLE RESISTOR
OVERSHOOT LIMITER
BIAS CIRCUIT
V/I CONVERTER
DETECTOR
SENSING AMP
OVERSHOOT AMP
DOLBY OFF: 1.5V
DOLBY ON: 2.6V
DOLBY OFF: 2.5V
DOLBY ON: 3.3V
DOLBY SW BOARD
S201 DOLBY NR
ON ← OFF
IC101, 201 (1/2) CX174A DOLBY/LINE AMP/RECORD AMP
Q103, 203 2SC2001 LINE MUTING
Q104, 204 2SC1364 RECORD MUTING
IC101, 201 (1/2) CX174A
RECORD LEVEL (L)
RECORD AMP
TYPE I, II, III: 0.6V
TYPE IV: 0V
Q105-109 2SC1364
Q205-209 2SC1364
Q321 2SC1364
RECORD EQ SWITCH
Q311 2SA1015 Q312 2SC1364 RECORD SWITCH
R REC
R PB
SAME AS L-CH
(REFERENCE NUMBERS ARE CODED FROM 200.)
IC 303 (1/2)
IC201 (1/2)
GND (SIGNAL)
RECORD
BIAS
TO SYSTEM CONTROL BOARD
TAPE SW BOARD(1/2)
S202 TAPE SELECTOR AUTO
Q409 2SA1015 SWITCHING
S111 TAPE SELECT TYPE I/III
S112 TAPE SELECT TYPE I/II/III
S109 CASSETTE LOADING ON OFF (WHILE EJECT BUTTON IS PRESSED: OFF)
D307-310 SLR34PC5
D310 TYPE I (NORMAL)
D309 TYPE II (CrO2)
D308 TYPE III (Fe-Cr)
D307 TYPE IV (METAL)
Q304 2SC1364 AMS MUTING
Q305, 306 2SC1364 AMS DET
Q307 2SA1015 AMS DET
D301 1S1555
CASSETTE LOADING
LINE MUTE
REC MUTE
AMS SIGNAL
AMS MUTE
Q318 2SD809 VOL. REG
Q319, 320 2SC1364
D312, 313 10E2
D311 HZ6BIL
CNJ101
GND
L REC
L PB
R REC
R PB
GND (SIGNAL)
GND (POWER SUPPLY)
+DC (AC POWER SUPPLY)
+DC (BUTTERY: 12V)
TO TA-78
GND (POWER SUPPLY)

Applicable Serial No.:
AEP Model: 503,301 and later
UK Model: 609,501 and later
E1 Model: 322,901 and later
E2 Model: 405,401 and later

EXPLODED VIEWS

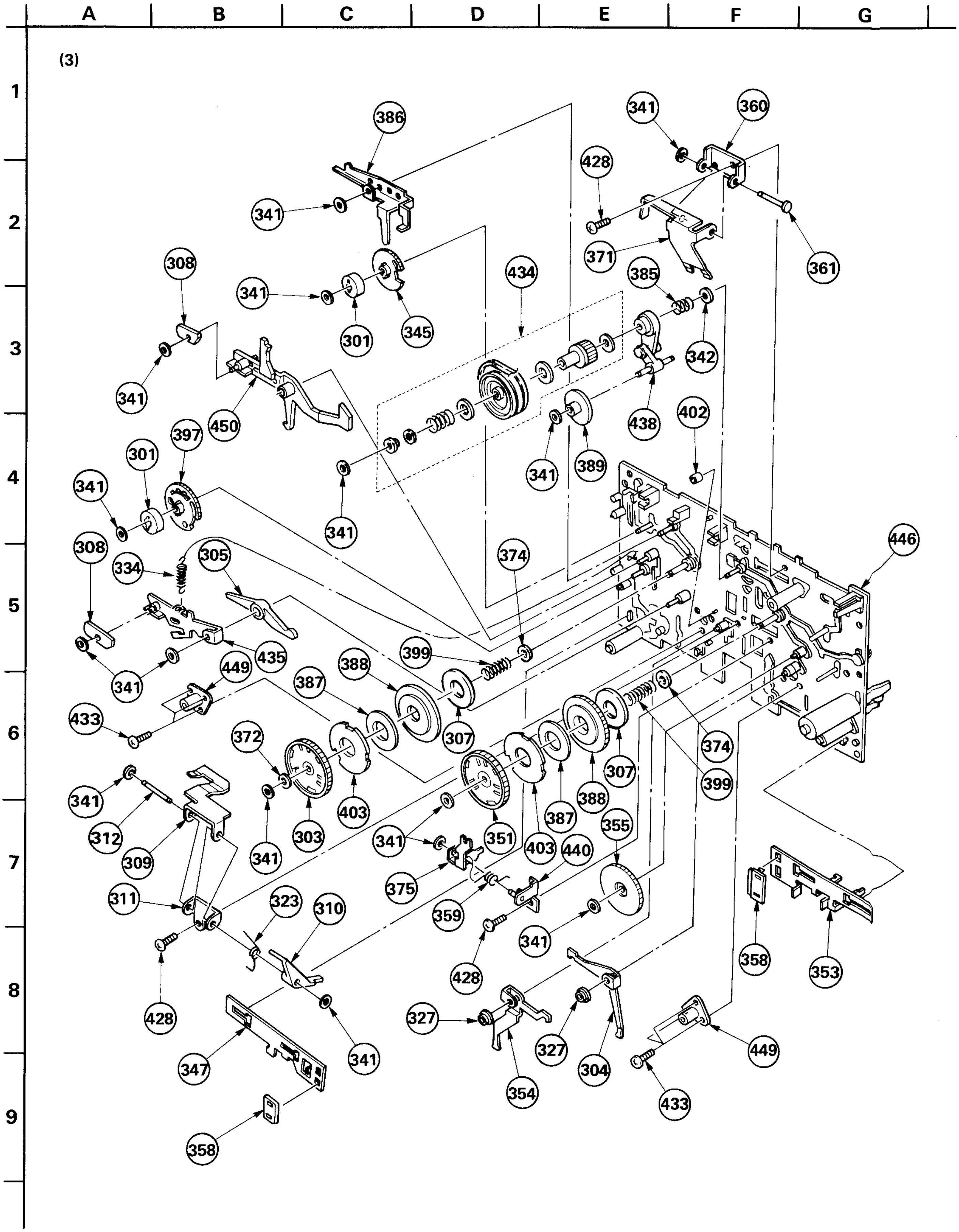

A
B
C
D
E
F
G
1
2
3
4
5
6
7
8
9
(1)
381
382
380
HRP
423
442
HE
367
420
368
502
363
356
366
348
379
419
341
414
332
320
316
415
424
318
419
373
331
340
406
376
315
317
443
428
357
409
416
344
337
445
336
419
451
428
501
411
335
338
422
325
439
319
341
352
339
324
362
330
428
369
322
350
452
391
400
407
346
321
333
PL2
329
364
343
341
436
453
400
365
PL1
349
390
437
426
428

Applicable Serial No.:
AEP Model: 503,301 and later E1 Model: 322,901 and later
UK Model: 609,501 and later E2 Model: 405,401 and later


A
B
C
D
E
F
G
1
2
3
4
5
6
7
8
9
(2)
393
341
341
395
396
313
PM1, PM2
314
431
425
377
431
448
410
394
383
444
428
413
370
432
306
425
410
428
392
429
404
412
365
377
302
405
384
447
441
398
418
417
432
444
430
504
429
503
505
326
428
408
378
384
M1
506
418
328
428

Applicable Serial No.:
AEP Model: 503,301 and later
UK Model: 609,501 and later
E1 Model: 322,901 and later
E2 Model: 405,401 and later

(3)


A
B
C
D
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Applicable Serial No.:
AEP Model: 503,301 and later **E1 Model: 322,901 and later**
UK Model: 609,501 and later **E2 Model: 405,401 and later**

PARTS LIST

MECHANISM SECTION

No.	Part No.	Description
301	1-452-202-00	MAGNET
302	3-002-407-11	COLLAR
303	3-307-305-00	GEAR (T), REEL
304	♠;3-307-306-00	LEVER, SELECT, REVERSE
305	3-307-307-00	LEVER, FWD
306	3-307-309-00	RETAINER (A), THRUST
307	3-307-313-00	PLATE, YOKE
308	3-307-315-00	ARBOR, MOVABLE
309	3-307-319-00	RETAINER, TAKE-UP GEAR
310	3-307-328-00	LEVER, TAKE-UP SELECTION
311	♠;3-307-329-00	PLATE, FULCRUM, SELECTION LEVER
312	3-307-330-00	PIN, FULCRUM PLATE
313	3-307-332-00	ARBOR, FIXED
314	3-307-333-00	ARBOR, TRIGGER
315	♠;3-307-337-00	LEVER, REC DETECTION
316	♠;3-307-338-00	LEVER, METAL DETECTION
317	♠;3-307-339-00	SHAFT, DETECTION LEVER
318	♠;3-307-344-00	LEVER, HALF RETAINER
319	3-307-345-00	SLIDER, EJECT
320	♠;3-307-346-00	LEVER, DETECTION
321	3-307-347-00	PISTON
322	3-307-348-00	ROLLER
323	3-307-355-00	SPRING
324	3-307-362-00	CAP, REEL
325	3-307-363-00	CLAW (N), REEL
326	3-307-366-00	BELT, FAST FORWARD
327	3-307-367-00	BUSHING, SELECT LEVER
328	♠;3-307-370-00	BRACKET, SWITCH
329	3-307-371-00	SPRING (LEFT)
330	3-307-372-00	SPRING (RIGHT)
331	3-307-374-00	SPRING, TENSION
332	3-307-375-00	SPRING, TENSION
333	3-307-377-00	SPRING, TENSION
334	3-307-378-00	SPRING, TENSION
335	3-307-380-00	SPRING, COMPRESSION
336	3-307-381-00	SPRING, TENSION
337	3-307-382-00	SPRING
338	3-307-383-00	SPRING
339	3-307-390-00	BUSHING, LOADING SPRING
340	3-307-391-00	SPRING
341	3-307-394-00	RETAINER (B), THRUST
342	3-307-395-00	RETAINER, SPRING
343	3-307-397-00	SLIDER, PAUSE
344	♠;3-307-399-00	SLIDER, MODE
345	3-307-401-00	GEAR, FF CAM

MECHANISM SECTION

No.	Part No.	Description
346	7-685-533-19	SCREW +BTP 2.6X6 TYPE2 N-S
347	♠;3-307-403-00	SLIDER, FWD
348	♠;3-307-404-00	RETAINER, DETECTION SWITCH
349	♠;3-307-405-00	PLATE, FULCRUM, CASSETTE HOLDER
350	3-307-407-00	HOLDER, CASSETTE
351	3-307-412-00	GEAR, TAKE-UP REEL
352	3-307-416-00	STOPPER, LOADING
353	♠;3-307-420-00	SLIDER, REVERSE
354	♠;3-307-421-00	LEVER (R), FWD SELECTION
355	3-307-423-00	GEAR (S), DRIVING
356	3-307-427-00	GEAR, HEAD, ROTARY
357	3-307-435-00	NUT, ADJUSTMENT, TAPE GUIDE
358	♠;3-307-437-00	BLOCK, HEAD SELECTION
359	3-307-441-00	SPRING
360	♠;3-307-443-00	BRACKET, RETAINER, SUPPLY GEAR
361	♠;3-307-445-00	SHAFT, RETAINER, SUPPLY GEAR
362	3-307-447-00	CLAW (R), REEL
363	3-307-448-00	SCREW, ADJUSTMENT, AZIMUTH
364	♠;3-307-449-00	LEVER (R), PAUSE
365	♠;3-307-450-00	ROD, PULL, PAUSE
366	3-307-457-00	SPRING
367	3-307-458-00	PLATE (L), ADJUSTMENT, HEAD
368	3-307-460-00	SPRING, COMPRESSION
369	3-307-461-00	SPRING, TENSION
370	♠;3-307-462-00	RETAINER (R), THRUST
371	♠;3-307-464-00	RETAINER, SUPPLY GEAR
372	3-307-465-00	RETAINER, TAKE-UP
373	♠;3-307-466-00	CLAMP
374	♠;3-307-467-00	RETAINER, SPRING
375	3-307-469-00	LEVER, SELECTION, SUPPLY
376	3-307-470-00	GUIDE (L), TAPE
377	♠;3-307-472-00	BRACKET, MD
378	♠;3-307-474-00	LEVER (R2), EJECT
379	3-307-477-01	SEAM (A), HEAD ADJUSTMENT
379	3-307-477-11	SEAM (A), HEAD ADJUSTMENT
379	3-307-477-21	SEAM (A), HEAD ADJUSTMENT
379	3-307-477-31	SEAM (A), HEAD ADJUSTMENT
379	3-307-477-41	SEAM (A), HEAD ADJUSTMENT
380	3-307-479-01	SEAM (B), HEAD ADJUSTMENT
380	3-307-479-11	SEAM (B), HEAD ADJUSTMENT
380	3-307-479-21	SEAM (B), HEAD ADJUSTMENT
380	3-307-479-31	SEAM (B), HEAD ADJUSTMENT
381	3-307-480-02	SEAM, HEAD
382	3-307-481-00	BASE, HEAD
383	3-307-482-00	WASHER, LUMILER

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- Due to standardization, parts with part numbers (Δ-ΔΔΔ-ΔΔΔ-XX or Δ-ΔΔΔΔ-ΔΔΔ-X) may be different from those used in the set.

CAPACITORS:

- All capacitors are in µF. Common capacitors are omitted. Refer to the following lists for their part numbers. MF:µF, PF:µµF.

RESISTORS

- All resistors are in ohms. Common 1/4W, 1/8W and 1/16W carbon resistors are omitted. Refer to the following lists for their part numbers.
- F : nonflammable

COILS

- MMH : mH, UH : µH

SEMICONDUCTORS

In each case, U : µ, for example:
UA···: µA···, UPA···: µPA ···, UPC···: µPC,
UPD···: µPD···

MECHANISM SECTION

No.	Part No.	Description
384	3-307-483-00	BELT (R), CAPSTAN
385	3-307-486-00	SPRING, COMPRESSION
386	♠;3-307-490-00	LEVER, FF
387	3-307-493-01	SPACER
387	3-307-493-11	SPACER
387	3-307-493-21	SPACER
387	3-307-493-31	SPACER
387	3-307-493-41	SPACER
387	3-307-493-51	SPACER
388	3-307-953-00	MAGNET, REEL TABLE
389	3-307-970-00	GEAR, FR
390	3-309-101-00	PLATE (A), ORNAMENTAL, MD
391	3-309-115-00	HOLDER, LAMP
392	♠;3-312-403-00	GEAR (S), PINION
393	3-312-405-00	PULLEY, DRIVING
394	3-312-406-00	GEAR (T), PINION
395	3-312-408-00	GEAR (B), CONVERSION
396	3-312-409-00	BELT, DRIVING
397	3-312-412-00	GEAR (B), CAM, FWD
398	♠;3-312-428-00	ARM (B), PUASE
399	3-312-429-00	SPRING, COMPRESSION
400	3-312-432-00	SPRING, TENSION
401	3-531-541-00	SPRING, TENSION
402	3-538-051-00	RUBBER, BRAKE
403	3-561-827-11	PLATE (A), HYSTERESIS
404	3-570-027-00	SCREW, MOTOR
405	3-570-118-00	CUSHION, MOTOR
406	3-570-914-00	SPRING, TENSION
407	3-575-392-00	RING, PISTON
408	3-578-393-00	SPRING, TENSION
409	3-644-718-00	SPRING, COMPRESSION
410	3-701-438-11	WASHER, 2.5
411	3-701-467-00	SCREW, LOCK
412	♠;4-861-002-11	HEAT SINK
413	♠;4-866-647-00	HEAT SINK
414	7-621-255-20	SCREW +P 2X4
415	7-621-259-35	SCREW +P 2.6X5
416	7-621-555-35	SCREW +K 2X5
417	7-621-733-08	SET-SCT, HEX 2X4 FLAT POINT
418	7-621-760-05	+PSW, 2.6X16
419	7-621-772-00	SCREW +B 2X3
420	7-621-772-40	SCREW +B 2X8
421	7-621-775-00	SCREW +B 2.6X3
422	7-624-105-04	STOP RING 2.3, TYPE -E
423	7-627-552-07	SCREW, PRECISION +P 1.7X2.5

MECHANISM SECTION

No.	Part No.	Description
424	7-671-111-11	STEEL, BOUL 1.5MM
425	7-682-546-04	SCREW +BVTT 3X5 (S)
426	7-685-104-19	SCREW +P 2X6 TYPE2 NON-SLIT
427	7-685-851-01	SCREW +BVTT 2X4 (S)
428	7-685-860-04	SCREW +BVTT 2.6X4 (S)
429	7-685-871-01	SCREW +BVTT 3X6 (S)
430	7-685-876-01	SCREW, +B 3X16 (S)
431	7-687-204-21	TOTSU PTPWH 2X6 NON-SLIT, TYPE2
432	7-687-246-21	SCREW, TOTSU PTPWH 3X8, TYPE2
433	7-687-701-39	SCREW, TOTSU BTT 2.6X4
434	A-2142-022-A	PULLEY ASSY, FR
435	♠;X-3307-305-0	LEVER ASSY, FWD LOCK
436	X-3307-307-0	PINCH ROLLER (N) ASSY
437	♠;X-3307-310-0	PLATE (RIGHT) ASSY, SIDE
438	X-3307-312-0	LEVER ASSY, FR
439	X-3307-316-0	PINCH ROLLER (R) ASSY
440	♠;X-3307-317-3	PLATE ASSY, FULCRUM, LEVER
441	♠;X-3307-319-0	ARM (A) ASSY, PAUSE
442	X-3307-321-0	HOLDER ASSY, HEAD
443	X-3307-323-0	CHASSIS (R) ASSY, HEAD
444	♠;X-3307-326-0	PLATE (R2) ASSY, FULCRUM, EJECT
445	♠;X-3307-327-0	PLATE (L2) ASSY, SIDE
446	X-3307-331-1	CHASSIS ASSY, MECHANISM
447	X-3307-336-2	FLYWHEEL (RS) ASSY
448	X-3307-337-2	FLYWHEEL (RT) ASSY
449	X-3307-338-0	BEARING ASSY, CAPSTAN
450	X-3307-348-0	LEVER ASSY, FF LOCK
451	X-3307-920-0	PLATE ASSY, ADJUSTMENT
452	X-3309-102-0	PLATE ASSY, ORNAMENTAL, HEAD
453	3-312-432-11	SPRING, TENSION

ELECTRICAL PARTS

Ref.No.	Part No.	Description			
501	♠;1-608-170-00	PC BOARD, HEAD TRANSLATION			
502	♠;1-608-268-00	PC BOARD, ERASE HEAD			
503	♠;1-608-391-00	PC BOARD, SYSTEM CONTROL			
504	♠;1-608-637-00	PC BOARD, KICK			
505	♠;A-2019-156-A	MOUNTED PCB, SYSTEM CONTROL			
506	♠;1-608-394-00	PC BOARD, TAPE SW			
C101	1-123-354-00	ELECT	3.3MF	20%	50V
C102	1-123-354-00	ELECT	3.3MF	20%	50V
C103	1-123-382-00	ELECT	3.3MF	20%	50V

NOTE:

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- Due to standardization, parts with part numbers (Δ-ΔΔΔ-ΔΔΔ-XX or Δ-ΔΔΔΔ-ΔΔΔ-X) may be different from those used in the set.

CAPACITORS:

- All capacitors are in μF. Common capacitors are omitted. Refer to the following lists for their part numbers. MF:μF, PF:μμF.

RESISTORS

- All resistors are in ohms. Common 1/4W, 1/8W and 1/16W carbon resistors are omitted. Refer to the following lists for their part numbers.
- F : nonflammable

COILS

- MMH : mH, UH : μH

SEMICONDUCTORS

In each case, U : μ, for example:
UA···: μA···, UPA···: μPA···, UPC···: μPC, UPD···: μPD···

Applicable Serial No.:
AEP Model: 503,301 and later **E1 Model: 322,901 and later**
UK Model: 609,501 and later **E2 Model: 405,401 and later**

ELECTRICAL PARTS

Ref.No.	Part No.	Description			
C104	1-123-380-00	ELECT	1MF	20%	50V
C105	1-123-356-00	ELECT	10MF	20%	16V
C106	1-161-322-00	CERAMIC	820PF	10%	50V
C107	1-161-322-00	CERAMIC	820PF	10%	50V
C108	1-123-369-00	ELECT	4.7MF	20%	25V
C109	1-107-167-00	MICA	75PF	5%	500V
C110	1-123-307-00	ELECT	100MF	20%	10V
C111	1-130-624-00	FILM	0.022MF	5%	50V
C112	1-123-354-00	ELECT	3.3MF	20%	50V
C114	1-161-316-00	CERAMIC	270PF	10%	50V
C115	1-161-377-00	CERAMIC	0.0047MF	20%	50V
C116	1-123-354-00	ELECT	3.3MF	20%	50V
C117	1-123-310-00	ELECT	470MF	20%	10V
C118	1-123-286-00	ELECT	0.33MF	20%	50V
C119	1-130-632-00	FILM	0.1MF	5%	50V
C120	1-130-627-00	FILM	0.039MF	5%	50V
C121	1-130-621-00	FILM	0.012MF	5%	50V
C122	1-123-356-00	ELECT	10MF	20%	16V
C123	1-130-629-00	FILM	0.056MF	5%	50V
C124	1-130-628-00	FILM	0.047MF	5%	50V
C125	1-130-624-00	FILM	0.022MF	5%	50V
C126	1-108-575-00	MYLAR	0.0068MF	5%	50V
C127	1-123-369-00	ELECT	4.7MF	20%	50V
C128	1-123-369-00	ELECT	4.7MF	20%	50V
C129	1-123-380-00	ELECT	1MF	20%	50V
C130	1-123-354-00	ELECT	3.3MF	20%	50V
C131	1-123-356-00	ELECT	10MF	20%	16V
C132	1-130-626-00	FILM	0.033MF	5%	50V
C133	1-130-621-00	FILM	0.012MF	5%	50V
C134	1-108-565-00	MYLAR	0.0027MF	5%	50V
C135	1-108-563-00	MYLAR	0.0022MF	5%	50V
C136	1-130-627-00	FILM	0.039MF	5%	50V
C137	1-130-627-00	FILM	0.039MF	5%	50V
C138	1-108-555-00	MYLAR	0.001MF	5%	50V
C139	1-130-627-00	FILM	0.039MF	5%	50V
C140	1-108-571-00	MYLAR	0.0047MF	5%	50V
C141	1-107-167-00	MICA	75PF	5%	500V
C143	1-123-319-00	ELECT	47MF	20%	16V
C209	1-107-167-00	MICA	75PF	5%	500V
C211	1-130-624-00	FILM	0.022MF	5%	50V
C219	1-130-632-00	FILM	0.1MF	5%	50V
C220	1-130-627-00	FILM	0.039MF	5%	50V
C221	1-130-621-00	FILM	0.012MF	5%	50V
C223	1-130-629-00	FILM	0.056MF	5%	50V
C224	1-130-628-00	FILM	0.047MF	5%	50V

ELECTRICAL PARTS

Ref.No.	Part No.	Description			
C225	1-130-624-00	FILM	0.022MF	5%	50V
C232	1-130-626-00	FILM	0.033MF	5%	50V
C233	1-130-621-00	FILM	0.012MF	5%	50V
C236	1-130-627-00	FILM	0.039MF	5%	50V
C237	1-130-627-00	FILM	0.039MF	5%	50V
C239	1-130-627-00	FILM	0.039MF	5%	50V
C241	1-107-167-00	MICA	75PF	5%	500V
C301	1-123-332-00	ELECT	47MF	20%	25V
C302	1-123-294-00	ELECT	47MF	20%	6.3V
C303	1-123-323-00	ELECT	470MF	20%	16V
C304	1-123-380-00	ELECT	1MF	20%	50V
C305	1-131-371-00	TANTALUM	10MF	20%	16V
C306	1-123-328-00	ELECT	4.7MF	20%	25V
C307	1-161-377-00	CERAMIC	0.0047MF	20%	50V
C308	1-161-259-00	CERAMIC	10PF	5%	50V
C309	1-123-356-00	ELECT	10MF	20%	16V
C310	1-123-380-00	ELECT	1MF	20%	50V
C311	1-123-382-00	ELECT	3.3MF	20%	50V
C312	1-123-354-00	ELECT	3.3MF	20%	50V
C314	1-123-379-00	ELECT	0.47MF	20%	50V
C315	1-124-089-00	ELECT	2.2MF	20%	50V
C316	1-130-291-00	FILM	0.0056MF	5%	100V
C317	1-130-291-00	FILM	0.0056MF	5%	100V
C318	1-130-293-00	FILM	0.0068MF	5%	100V
C319	1-123-379-00	ELECT	0.47MF	20%	50V
C320	1-123-380-00	ELECT	1MF	20%	50V
C321	1-129-714-00	FILM	0.01MF	5%	630V
C322	1-129-928-00	MYLAR	0.0027MF	99%	630V
C323	1-129-898-00	FILM	0.0022MF	5%	630V
C324	1-123-308-00	ELECT	220MF	20%	10V
C325	1-101-880-00	CERAMIC	47PF	5%	50V
C402	1-123-328-00	ELECT	4.7MF	20%	25V
C403	1-108-571-00	MYLAR	0.0047MF	5%	50V
C412	1-123-354-00	ELECT	3.3MF	20%	50V
C413	1-123-380-00	ELECT	1MF	20%	50V
C414	1-123-323-00	ELECT	470MF	20%	16V
C415	1-123-298-00	ELECT	470MF	20%	6.3V
C417	1-161-328-00	CERAMIC	0.0047MF	30%	50V
CNJ101	1-562-068-00	SOCKET, CONNECTOR 13P			
♠CNJ102;	1-560-060-00	PIN, CONNECTOR 2P			
♠CNJ103;	1-560-061-00	PIN, CONNECTOR 3P			
♠CNJ104;	1-560-063-00	PIN, CONNECTOR 5P			
♠CNJ105;	1-560-064-00	PIN, CONNECTOR 6P			
♠CNJ106;	1-560-338-00	PIN, CONNECTOR 7P			
♠CNJ107;	1-560-064-00	PIN, CONNECTOR 6P			

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UPD···: μPD···

ELECTRICAL PARTS

Ref.No.	Part No.	Description
CT101	1-141-225-00	CAP, TUNING, TRIMMER
CT201	1-141-225-00	CAP, TUNING, TRIMMER
D101	8-719-815-55	DIODE 1S1555
D102	8-719-815-55	DIODE 1S1555
D103	8-719-815-55	DIODE 1S1555
D201	8-719-815-55	DIODE 1S1555
D202	8-719-815-55	DIODE 1S1555
D203	8-719-815-55	DIODE 1S1555
D301	8-719-815-55	DIODE 1S1555
D302	8-719-815-55	DIODE 1S1555
D303	8-719-815-55	DIODE 1S1555
D304	8-719-815-55	DIODE 1S1555
D305	8-719-815-55	DIODE 1S1555
D306	8-719-815-55	DIODE 1S1555
D307	8-719-902-77	DIODE SLR-34PC5
D308	8-719-902-77	DIODE SLR-34PC5
D309	8-719-902-77	DIODE SLR-34PC5
D310	8-719-902-77	DIODE SLR-34PC5
D311	8-719-910-64	DIODE HZ6B1L
D312	8-719-200-02	DIODE 10E-2
D313	8-719-200-02	DIODE 10E-2
D402	8-719-815-55	DIODE 1S1555
D403	8-719-815-55	DIODE 1S1555
D404	8-719-902-78	DIODE SLR-34DC5
D405	8-719-934-05	DIODE SLR-34URC5
D406	8-719-902-51	DIODE SLP251B
D407	8-719-902-51	DIODE SLP251B
D408	8-719-902-51	DIODE SLP251B
D409	8-719-902-51	DIODE SLP251B
D410	8-719-902-51	DIODE SLP251B
D411	8-719-815-55	DIODE 1S1555
D412	8-719-815-55	DIODE 1S1555
D414	8-719-815-55	DIODE 1S1555
D416	8-719-815-55	DIODE 1S1555
D581	8-719-815-55	DIODE 1S1555
D582	8-719-815-55	DIODE 1S1555
HE	8-825-535-20	HEAD, ERASE (ES237-36)
HRP	8-825-548-10	HEAD, R/P (PA242-3602)
IC101	8-759-300-74	IC CX-174A
IC201	8-759-300-74	IC CX-174A
IC301	8-759-932-80	IC BA328
IC302	8-759-800-32	IC LB1403
IC303	8-759-700-08	IC NJM4558S
IC401	8-759-201-38	IC TC9310N-013
IC402	8-759-700-11	IC NJM78M05A

ELECTRICAL PARTS

Ref.No.	Part No.	Description
L101	1-408-255-00	MICRO INDUCTOR 6.8MMH
L102	1-408-260-00	MICRO INDUCTOR 18MMH
L103	1-408-262-00	MICRO INDUCTOR 27MMH
L201	1-408-255-00	MICRO INDUCTOR 6.8MMH
L202	1-408-260-00	MICRO INDUCTOR 18MMH
L203	1-408-262-00	MICRO INDUCTOR 27MMH
L301	1-407-173-XX	MICRO INDUCTOR 220UH
M1	X-3307-322-2	MOTOR (R) ASSY
PL1	1-518-512-11	LAMP, PILOT
PL2	1-518-512-21	LAMP, PILOT
PM1	1-454-316-00	SOLENOID, PLUNGER
PM2	1-454-316-00	SOLENOID, PLUNGER
Q101	8-729-334-58	TRANSISTOR 2SC1345
Q102	8-729-178-54	TRANSISTOR 2SC2785
Q103	8-729-100-13	TRANSISTOR 2SC2001
Q104	8-729-178-54	TRANSISTOR 2SC2785
Q105	8-729-178-54	TRANSISTOR 2SC2785
Q106	8-729-178-54	TRANSISTOR 2SC2785
Q107	8-729-178-54	TRANSISTOR 2SC2785
Q108	8-729-178-54	TRANSISTOR 2SC2785
Q109	8-729-178-54	TRANSISTOR 2SC2785
Q201	8-729-334-58	TRANSISTOR 2SC1345
Q202	8-729-178-54	TRANSISTOR 2SC2785
Q203	8-729-100-13	TRANSISTOR 2SC2001
Q204	8-729-178-54	TRANSISTOR 2SC2785
Q205	8-729-178-54	TRANSISTOR 2SC2785
Q206	8-729-178-54	TRANSISTOR 2SC2785
Q207	8-729-178-54	TRANSISTOR 2SC2785
Q208	8-729-178-54	TRANSISTOR 2SC2785
Q209	8-729-178-54	TRANSISTOR 2SC2785
Q301	8-759-101-13	IC UPA74V-FA
Q302	8-759-101-13	IC UPA74V-FA
Q303	8-729-178-54	TRANSISTOR 2SC2785
Q304	8-729-178-54	TRANSISTOR 2SC2785
Q305	8-729-178-54	TRANSISTOR 2SC2785
Q306	8-729-178-54	TRANSISTOR 2SC2785
Q307	8-729-201-52	TRANSISTOR 2SA1015
Q309	8-729-178-54	TRANSISTOR 2SC2785
Q310	8-729-178-54	TRANSISTOR 2SC2785
Q311	8-729-201-52	TRANSISTOR 2SA1015
Q312	8-729-178-54	TRANSISTOR 2SC2785
Q313	8-729-663-47	TRANSISTOR 2SC1364
Q314	8-729-663-47	TRANSISTOR 2SC1364
Q315	8-729-178-54	TRANSISTOR 2SC2785
Q316	8-729-201-52	TRANSISTOR 2SA1015

NOTE:
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- Items marked " ♠ " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- Due to standardization, parts with part numbers (Δ-ΔΔΔ-ΔΔΔ-XX or Δ-ΔΔΔΔ-ΔΔΔ-X) may be different from those used in the set.

CAPACITORS:
- All capacitors are in μF. Common capacitors are omitted. Refer to the following lists for their part numbers. MF:μF, PF:μμF.

RESISTORS
- All resistors are in ohms. Common 1/4W, 1/8W and 1/16W carbon resistors are omitted. Refer to the following lists for their part numbers.

- F : nonflammable

COILS
- MMH : mH, UH : μH

SEMICONDUCTORS
In each case, U : μ, for example:
UA···: μA···, UPA···: μPA···, UPC···: μPC, UPD···: μPD···

ELECTRICAL PARTS

Ref.No.	Part No.	Description			
Q317	8-729-178-54	TRANSISTOR 2SC2785			
Q318	8-729-180-92	TRANSISTOR 2SD809-K			
Q319	8-729-178-54	TRANSISTOR 2SC2785			
Q320	8-729-178-54	TRANSISTOR 2SC2785			
Q321	8-729-178-54	TRANSISTOR 2SC2785			
Q322	8-729-178-54	TRANSISTOR 2SC2785			
Q401	8-729-117-54	TRANSISTOR 2SA1175			
Q402	8-719-902-01	PHOTO INTERRUPTOR SPI201-20			
Q403	8-729-663-47	TRANSISTOR 2SC1364			
Q404	8-729-663-47	TRANSISTOR 2SC1364			
Q405	8-729-663-47	TRANSISTOR 2SC1364			
Q406	8-729-663-47	TRANSISTOR 2SC1364			
Q408	8-729-663-47	TRANSISTOR 2SC1364			
Q410	8-729-117-54	TRANSISTOR 2SA1175			
Q411	8-729-663-47	TRANSISTOR 2SC1364			
Q412	8-729-117-54	TRANSISTOR 2SA1175			
Q413	8-729-180-92	TRANSISTOR 2SD809-K			
Q581	8-729-612-77	TRANSISTOR 2SA1027R			
R101	1-246-473-00	CARBON	1K	5%	1/4W
R102	1-246-521-00	CARBON	100K	5%	1/4W
R103	1-246-521-00	CARBON	100K	5%	1/4W
R104	1-246-523-00	CARBON	120K	5%	1/4W
R105	1-246-481-00	CARBON	2.2K	5%	1/4W
R106	1-246-511-00	CARBON	39K	5%	1/4W
R107	1-246-483-00	CARBON	2.7K	5%	1/4W
R108	1-246-455-00	CARBON	180	5%	1/4W
R109	1-246-521-00	CARBON	100K	5%	1/4W
R110	1-246-521-00	CARBON	100K	5%	1/4W
R111	1-246-521-00	CARBON	100K	5%	1/4W
R112	1-246-525-00	CARBON	150K	5%	1/4W
R113	1-246-473-00	CARBON	1K	5%	1/4W
R115	1-246-800-00	CARBON	27K	5%	1/8W
R116	1-246-507-00	CARBON	27K	5%	1/4W
R117	1-246-449-00	CARBON	100	5%	1/4W
R118	1-246-524-00	CARBON	130K	5%	1/4W
R119	1-246-490-00	CARBON	5.1K	5%	1/4W
R121	1-246-501-00	CARBON	15K	5%	1/4W
R122	1-246-503-00	CARBON	18K	5%	1/4W
R123	1-246-529-00	CARBON	220K	5%	1/4W
R124	1-246-787-00	CARBON	2.2K	5%	1/8W
R125	1-246-497-00	CARBON	10K	5%	1/4W
R126	1-246-497-00	CARBON	10K	5%	1/4W
R127	1-246-513-00	CARBON	47K	5%	1/4W
R128	1-246-513-00	CARBON	47K	5%	1/4W
R129	1-246-533-00	CARBON	330K	5%	1/4W

ELECTRICAL PARTS

Ref.No.	Part No.	Description			
R130	1-246-530-00	CARBON	240K	5%	1/4W
R131	1-246-530-00	CARBON	240K	5%	1/4W
R132	1-246-499-00	CARBON	12K	5%	1/4W
R133	1-246-492-00	CARBON	6.2K	5%	1/4W
R134	1-246-449-00	CARBON	100	5%	1/4W
R135	1-246-455-00	CARBON	180	5%	1/4W
R136	1-246-463-00	CARBON	390	5%	1/4W
R137	1-246-475-00	CARBON	1.2K	5%	1/4W
R138	1-246-501-00	CARBON	15K	5%	1/4W
R139	1-246-509-00	CARBON	33K	5%	1/4W
R140	1-246-538-00	CARBON	510K	5%	1/4W
R141	1-246-513-00	CARBON	47K	5%	1/4W
R142	1-246-481-00	CARBON	2.2K	5%	1/4W
R143	1-246-497-00	CARBON	10K	5%	1/4W
R144	1-246-501-00	CARBON	15K	5%	1/4W
R145	1-246-473-00	CARBON	1K	5%	1/4W
R146	1-246-489-00	CARBON	4.7K	5%	1/4W
R147	1-246-473-00	CARBON	1K	5%	1/4W
R148	1-246-521-00	CARBON	100K	5%	1/4W
R149	1-246-523-00	CARBON	120K	5%	1/4W
R150	1-246-523-00	CARBON	120K	5%	1/4W
R151	1-246-771-00	CARBON	100	5%	1/8W
R152	1-246-788-00	CARBON	2.7K	5%	1/8W
R153	1-246-782-00	CARBON	820	5%	1/8W
R154	1-246-797-00	CARBON	15K	5%	1/8W
R155	1-246-505-00	CARBON	22K	5%	1/4W
R156	1-246-779-00	CARBON	470	5%	1/8W
R157	1-246-853-89	CARBON	6.2K	5%	1/8W
R158	1-247-851-00	CARBON	6.8K	5%	1/6W
R159	1-246-505-00	CARBON	22K	5%	1/4W
R160	1-246-787-00	CARBON	2.2K	5%	1/8W
R161	1-246-784-00	CARBON	1.2K	5%	1/8W
R162	1-246-505-00	CARBON	22K	5%	1/4W
R163	1-246-791-00	CARBON	4.7K	5%	1/8W
R164	1-246-796-00	CARBON	12K	5%	1/8W
R165	1-246-791-00	CARBON	4.7K	5%	1/8W
R166	1-246-505-00	CARBON	22K	5%	1/4W
R167	1-246-799-00	CARBON	22K	5%	1/8W
R301	1-246-491-00	CARBON	5.6K	5%	1/4W
R302	1-246-497-00	CARBON	10K	5%	1/4W
R303	1-246-493-00	CARBON	6.8K	5%	1/4W
R304	1-246-485-00	CARBON	3.3K	5%	1/4W
R305	1-246-491-00	CARBON	5.6K	5%	1/4W
R306	1-246-489-00	CARBON	4.7K	5%	1/4W
R307	1-247-863-00	CARBON	22K	5%	1/6W

NOTE:

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- Items marked " ♠ " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- Due to standardization, parts with part numbers (Δ-ΔΔΔ-ΔΔΔ-XX or Δ-ΔΔΔΔ-ΔΔΔ-X) may be different from those used in the set.

CAPACITORS:

- All capacitors are in μF. Common capacitors are omitted. Refer to the following lists for their part numbers. MF:μF, PF:μμF.

RESISTORS

- All resistors are in ohms. Common 1/4W, 1/8W and 1/16W carbon resistors are omitted. Refer to the following lists for their part numbers.
- F : nonflammable

COILS

- MMH : mH, UH : μH

SEMICONDUCTORS

In each case, U : μ, for example:
UA···: μA···, UPA···: μPA···, UPC···: μPC,
UPD···: μPD···

ELECTRICAL PARTS

Ref.No.	Part No.	Description			
R308	1-246-505-00	CARBON	22K	5%	1/4W
R309	1-246-470-00	CARBON	750	5%	1/4W
R310	1-246-799-00	CARBON	22K	5%	1/8W
R311	1-246-809-00	CARBON	150K	5%	1/8W
R312	1-246-806-00	CARBON	82K	5%	1/8W
R313	1-246-779-00	CARBON	470	5%	1/8W
R314	1-246-811-00	CARBON	220K	5%	1/8W
R315	1-246-811-00	CARBON	220K	5%	1/8W
R316	1-246-781-00	CARBON	680	5%	1/8W
R317	1-246-791-00	CARBON	4.7K	5%	1/8W
R318	1-246-799-00	CARBON	22K	5%	1/8W
R319	1-247-046-00	CARBON	270K	5%	1/8W
R320	1-246-783-00	CARBON	1K	5%	1/8W
R321	1-246-799-00	CARBON	22K	5%	1/8W
R322	1-246-799-00	CARBON	22K	5%	1/8W
R323	1-246-799-00	CARBON	22K	5%	1/8W
R325	1-246-796-00	CARBON	12K	5%	1/8W
R326	1-246-792-00	CARBON	5.6K	5%	1/8W
R327	1-246-791-00	CARBON	4.7K	5%	1/8W
R328	1-246-811-00	CARBON	220K	5%	1/8W
R329	1-246-799-00	CARBON	22K	5%	1/8W
R330	1-246-799-00	CARBON	22K	5%	1/8W
R331	1-246-795-00	CARBON	10K	5%	1/8W
R332	1-246-497-00	CARBON	10K	5%	1/4W
R333	1-246-497-00	CARBON	10K	5%	1/4W
R334	1-246-795-00	CARBON	10K	5%	1/8W
R335	1-246-803-00	CARBON	47K	5%	1/8W
R336	1-246-791-00	CARBON	4.7K	5%	1/8W
R337	1-246-795-00	CARBON	10K	5%	1/8W
R338	1-246-799-00	CARBON	22K	5%	1/8W
R339	1-246-799-00	CARBON	22K	5%	1/8W
R340	1-246-464-00	CARBON	430	5%	1/4W
R341	1-246-481-00	CARBON	2.2K	5%	1/4W
R342	1-246-477-00	CARBON	1.5K	5%	1/4W
R343	1-246-482-00	CARBON	2.4K	5%	1/4W
R344	1-246-799-00	CARBON	22K	5%	1/8W
R345	1-246-799-00	CARBON	22K	5%	1/8W
R346	1-246-799-00	CARBON	22K	5%	1/8W
R347	1-246-505-00	CARBON	22K	5%	1/4W
R348	1-246-465-00	CARBON	470	5%	1/4W
R351	1-246-427-00	CARBON	12	5%	1/4W
R352	1-246-493-00	CARBON	6.8K	5%	1/4W
R401	1-247-863-00	CARBON	22K	5%	1/6W
R402	1-247-887-00	CARBON	220K	5%	1/6W
R405	1-246-481-00	CARBON	2.2K	5%	1/4W

ELECTRICAL PARTS

Ref.No.	Part No.	Description				
R406	1-246-481-00	CARBON	2.2K	5%	1/4W	
R409	1-246-505-00	CARBON	22K	5%	1/4W	
R410	1-246-505-00	CARBON	22K	5%	1/4W	
R411	1-246-529-00	CARBON	220K	5%	1/4W	
R412	1-246-505-00	CARBON	22K	5%	1/4W	
R413	1-246-489-00	CARBON	4.7K	5%	1/4W	
R414	1-246-461-00	CARBON	330	5%	1/4W	
R415	1-247-863-00	CARBON	22K	5%	1/6W	
R416	1-247-867-00	CARBON	33K	5%	1/6W	
R417	1-246-465-00	CARBON	470	5%	1/4W	
R418	1-246-461-00	CARBON	330	5%	1/4W	
R419	1-246-491-00	CARBON	5.6K	5%	1/4W	
R420	1-246-491-00	CARBON	5.6K	5%	1/4W	
R421	1-246-509-00	CARBON	33K	5%	1/4W	
R422	1-246-514-00	CARBON	51K	5%	1/4W	
R423	1-246-505-00	CARBON	22K	5%	1/4W	
R424	1-246-521-00	CARBON	100K	5%	1/4W	
R425	1-247-855-00	CARBON	10K	5%	1/6W	
R426	1-247-825-00	CARBON	560	5%	1/6W	
R428	1-246-433-00	CARBON	22	5%	1/4W	
R429⚠	1-206-477-00	METAL OXIDE	39	5%	2W	F
R518	1-247-839-00	CARBON	2.2K	5%	1/6W	
RV101	1-226-236-00	RES, ADJ, CARBON 10K				
RV102	1-226-238-00	RES, ADJ, CARBON 50K				
RV201	1-226-236-00	RES, ADJ, CARBON 10K				
RV202	1-226-238-00	RES, ADJ, CARBON 50K				
RV301	1-226-239-00	RES, ADJ, CARBON 100K				
RY301	1-515-473-00	RELAY				
S101	1-552-412-00	SWITCH, KEY BOARD, REC MUTE				
S102	1-552-412-00	SWITCH, KEY BOARD, REC				
S103	1-552-412-00	SWITCH, KEY BOARD, PAUSE				
S104	1-552-412-00	SWITCH, KEY BOARD, FF				
S105	1-552-412-00	SWITCH, KEY BOARD, FWD				
S106	1-552-412-00	SWITCH, KEY BOARD, STOP				
S107	1-552-412-00	SWITCH, KEY BOARD, REVERSE				
S108	1-552-412-00	SWITCH, KEY BOARD, FAST REVERSE				
S109	1-554-205-00	SWITCH, SLIDE, CASSETTE LOADING				
S110	1-554-205-00	SWITCH, SLIDE, ERASE PROOF				
S111	1-554-205-00	SWITCH, SLIDE, TAPE SELECT				
S112	1-554-205-00	SWITCH, SLIDE, TAPE SELECT				
S201	1-554-118-00	SWITCH, PUSH, DOLBY NR				
S202	1-552-334-00	SWITCH, BAND CHANGER, TAPE SELECTOR				
S203	1-554-277-00	SWITCH, SLIDE, ISS				
T301	1-433-259-00	TRANSFORMER, BIAS OSCILLATOR				

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- Due to standardization, parts with part numbers (Δ-ΔΔΔ-ΔΔΔ-XX or Δ-ΔΔΔΔ-ΔΔΔ-X) may be different from those used in the set.

CAPACITORS:

- All capacitors are in μF. Common capacitors are omitted. Refer to the following lists for their part numbers. MF:μF, PF:μμF.

RESISTORS

- All resistors are in ohms. Common 1/4W, 1/8W and 1/16W carbon resistors are omitted. Refer to the following lists for their part numbers.
- F : nonflammable

COILS

- MMH : mH, UH : μH

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

SEMICONDUCTORS

In each case, U : μ, for example:
UA···: μA···, UPA···: μPA···, UPC···: μPC,
UPD···: μPD···

Sony Corporation
Consumer Products Group
Technical Support Dept.

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STEREO CASSETTE DECK
(TC-78)

FH-7
TC-78

AEP Model
UK Model
E Model

SUPPLEMENT

File this supplement with the service manual.

No. 3
April, 1983

Subject: SYSTEM CONTROL CIRCUIT CHANGE

- System control circuit and IC401 have been changed.
- Because of this change, three types of system control ICs (IC401) have been existed. Be careful to marking of IC401 in repairing.
- Use TC9310N-001 for replacing TC9310N-001.
  Use TC9310N-024 for replacing TC9310N-013 or TC9310N-024.

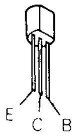
- **CHANGED PARTS**

Ref. No.	Former Parts	New Parts		Remarks
	Description	Part No.	Description	
D403	....	8-719-815-55	DIODE 1S1555	ADDED
D581	DIODE 1S1555	....		DELETED
D582	DIODE 1S1555	....		DELETED
IC401	IC TC9310N-013	8-759-201-52	IC TC9310N-024	
Q581	TRANSISTOR 2SA1027R	....		DELETED
R581	CARBON 2.2K 5% 1/6W	....		DELETED

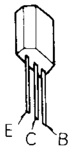
SONY®
SERVICE MANUAL

SEMICONDUCTOR LEAD LAYOUTS

2SA1015
2SC1345
2SC1364
2SC2001



2SA1175
2SC2785



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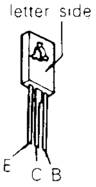
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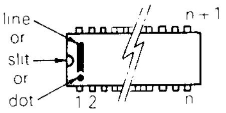
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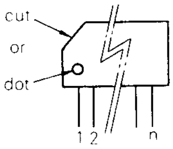
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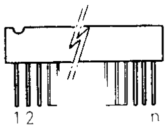

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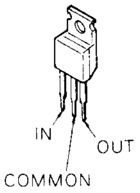
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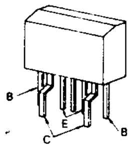
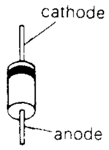
OUT
COMMON

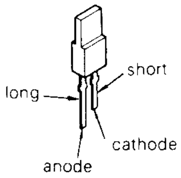
μPA74V-FA



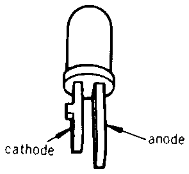
10E2
1S1555
HZ6B1L


cathode
anode

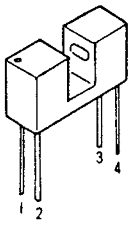
SLP251B

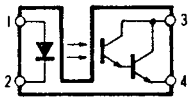

short
long
cathode
anode

SLR34DC5
SLR34PC5
SLR34URC5


cathode
anode

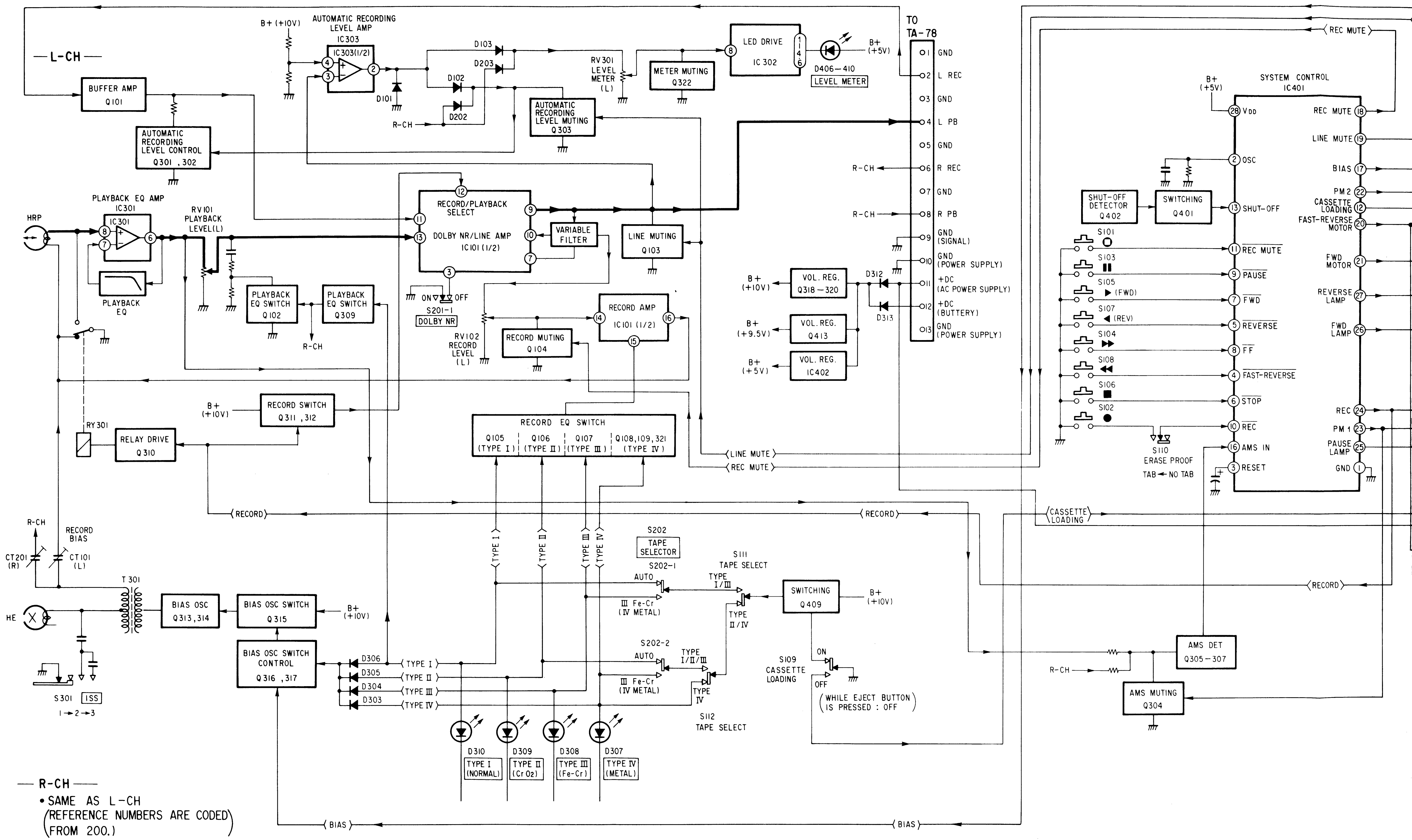
SPI201



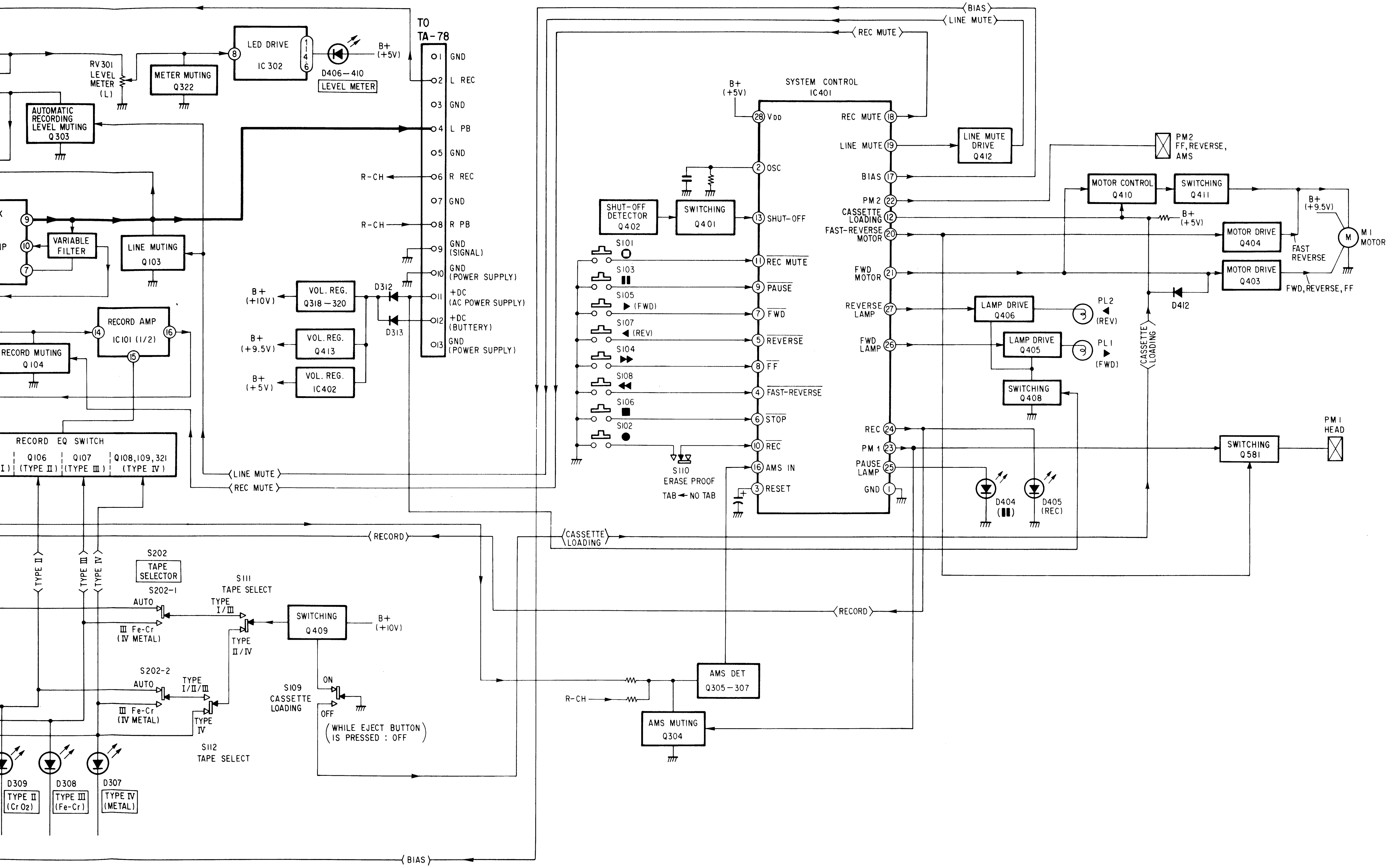


Applicable Serial No.:
AEP Model: 503,301 and later
UK Model: 609,501 and later
E1 Model: 322,901 and later
E2 Model: 405,401 and later

BLOCK DIAGRAM

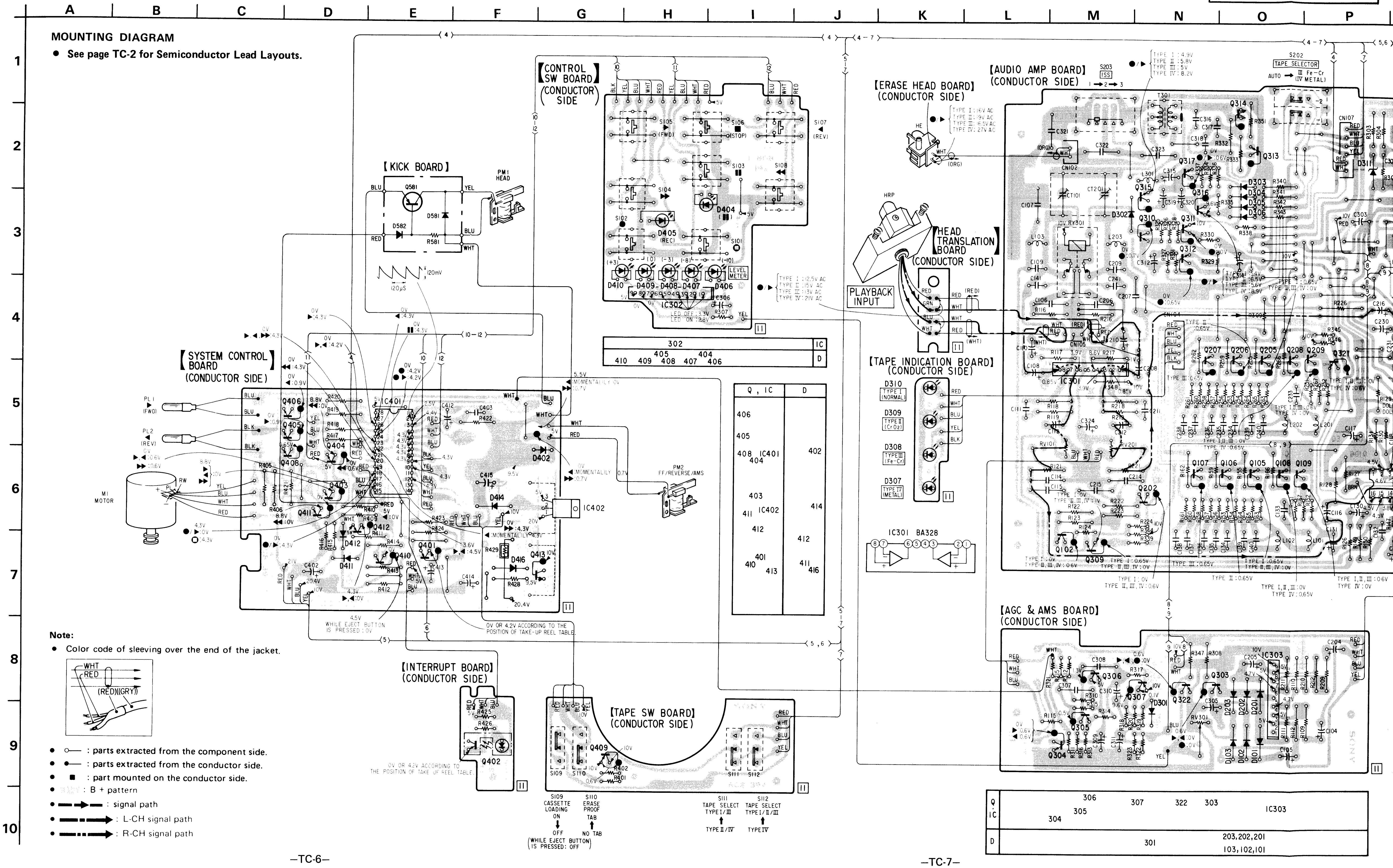

— L-CH —
BUFFER AMP Q101
AUTOMATIC RECORDING LEVEL CONTROL Q301, 302
B+ (+10V)
AUTOMATIC RECORDING LEVEL AMP IC303
IC303(1/2)
D101
D103
D203
D102
D202
R-CH
AUTOMATIC RECORDING LEVEL MUTING Q303
RV301 LEVEL METER (L)
METER MUTING Q322
LED DRIVE IC302
D406—410
LEVEL METER
B+ (+5V)
TO TA-78
1 GND
2 L REC
3 GND
4 L PB
5 GND
6 R REC
7 GND
8 R PB
9 GND (SIGNAL)
10 GND (POWER SUPPLY)
11 +DC (AC POWER SUPPLY)
12 +DC (BUTTERY)
13 GND (POWER SUPPLY)
PLAYBACK EQ AMP IC301
HRP
PLAYBACK EQ
RV101 PLAYBACK LEVEL(L)
PLAYBACK EQ SWITCH Q102
PLAYBACK EQ SWITCH Q309
RECORD/PLAYBACK SELECT
DOLBY NR/LINE AMP IC101 (1/2)
S201-1
ON OFF
DOLBY NR
VARIABLE FILTER
LINE MUTING Q103
RV102 RECORD LEVEL (L)
RECORD MUTING Q104
RECORD AMP IC101 (1/2)
VOL. REG. Q318—320
VOL. REG. Q413
VOL. REG. IC402
B+ (+10V)
B+ (+9.5V)
B+ (+5V)
D312
D313
RY301
RELAY DRIVE Q310
RECORD SWITCH Q311, 312
RECORD EQ SWITCH
Q105 (TYPE I)
Q106 (TYPE II)
Q107 (TYPE III)
Q108,109,321 (TYPE IV)
LINE MUTE
REC MUTE
RECORD
R-CH
RECORD BIAS
CT201 (R)
CT101 (L)
T301
HE
BIAS OSC Q313,314
BIAS OSC SWITCH Q315
B+ (+10V)
BIAS OSC SWITCH CONTROL Q316, 317
S301 ISS
1→2→3
D306
D305
D304
D303
TYPE I
TYPE II
TYPE III
TYPE IV
S202 TAPE SELECTOR
S202-1
AUTO
III Fe-Cr (IV METAL)
S202-2
S111 TAPE SELECT
TYPE I/III
TYPE II/IV
TYPE I/II/III
TYPE IV
S112 TAPE SELECT
SWITCHING Q409
B+ (+10V)
S109 CASSETTE LOADING
ON
OFF
(WHILE EJECT BUTTON IS PRESSED : OFF)
D310 TYPE I (NORMAL)
D309 TYPE II (CrO2)
D308 TYPE III (Fe-Cr)
D307 TYPE IV (METAL)
BIAS
REC MUTE
B+ (+5V)
SYSTEM CONTROL IC401
28 VDD
2 OSC
SHUT-OFF DETECTOR Q402
SWITCHING Q401
13 SHUT-OFF
S101
11 REC MUTE
S103
9 PAUSE
S105 (FWD)
7 FWD
S107 (REV)
5 REVERSE
S104
8 FF
S108
4 FAST-REVERSE
S106
6 STOP
S102
10 REC
S110 ERASE PROOF
TAB ← NO TAB
16 AMS IN
3 RESET
REC MUTE 18
LINE MUTE 19
BIAS 17
PM2 22
CASSETTE LOADING 12
FAST-REVERSE MOTOR 20
FWD MOTOR 21
REVERSE LAMP 27
FWD LAMP 26
REC 24
PM1 23
PAUSE LAMP 25
GND 1
CASSETTE LOADING
RECORD
AMS DET Q305—307
AMS MUTING Q304
R-CH

— R-CH —
- SAME AS L-CH
(REFERENCE NUMBERS ARE CODED FROM 200.)


TO TA-78
1 GND
2 L REC
3 GND
4 L PB
5 GND
6 R REC
7 GND
8 R PB
9 GND (SIGNAL)
10 GND (POWER SUPPLY)
11 +DC (AC POWER SUPPLY)
12 +DC (BUTTERY)
13 GND (POWER SUPPLY)
LED DRIVE IC 302
D406-410 LEVEL METER
B+ (+5V)
RV301 LEVEL METER (L)
METER MUTING Q322
AUTOMATIC RECORDING LEVEL MUTING Q303
VARIABLE FILTER
LINE MUTING Q103
RECORD AMP IC101 (1/2)
RECORD MUTING Q104
RECORD EQ SWITCH
Q106 (TYPE II)
Q107 (TYPE III)
Q108,109,321 (TYPE IV)
R-CH
B+ (+10V) VOL. REG. Q318-320
B+ (+9.5V) VOL. REG. Q413
B+ (+5V) VOL. REG. IC402
D312
D313
LINE MUTE
REC MUTE
RECORD
BIAS
CASSETTE LOADING
TYPE II
TYPE III
TYPE IV
S202 TAPE SELECTOR
S202-1 AUTO
III Fe-Cr (IV METAL)
S202-2 AUTO
S111 TAPE SELECT
TYPE I/III
TYPE II/IV
TYPE I/II/III
TYPE IV
S112 TAPE SELECT
SWITCHING Q409
B+ (+10V)
S109 CASSETTE LOADING
ON
OFF
(WHILE EJECT BUTTON IS PRESSED : OFF)
D309 TYPE II (CrO2)
D308 TYPE III (Fe-Cr)
D307 TYPE IV (METAL)
B+ (+5V)
SYSTEM CONTROL IC401
28 VDD
2 OSC
13 SHUT-OFF
11 REC MUTE
9 PAUSE
7 FWD
5 REVERSE
8 FF
4 FAST-REVERSE
6 STOP
10 REC
16 AMS IN
3 RESET
18 REC MUTE
19 LINE MUTE
17 BIAS
22 PM 2
12 CASSETTE LOADING
20 FAST-REVERSE MOTOR
21 FWD MOTOR
27 REVERSE LAMP
26 FWD LAMP
24 REC
23 PM 1
25 PAUSE LAMP
1 GND
SHUT-OFF DETECTOR Q402
SWITCHING Q401
S101
S103
S105 (FWD)
S107 (REV)
S104
S108
S106
S102
S110 ERASE PROOF
TAB ← NO TAB
LINE MUTE DRIVE Q412
PM2 FF, REVERSE, AMS
MOTOR CONTROL Q410
SWITCHING Q411
B+ (+9.5V)
B+ (+5V)
MOTOR DRIVE Q404
MOTOR DRIVE Q403
FAST REVERSE
FWD, REVERSE, FF
M1 MOTOR
D412
LAMP DRIVE Q406
LAMP DRIVE Q405
PL2 (REV)
PL1 (FWD)
SWITCHING Q408
D404
D405 (REC)
SWITCHING Q581
PM1 HEAD
AMS DET Q305-307
AMS MUTING Q304

MOUNTING DIAGRAM

- See page TC-2 for Semiconductor Lead Layouts.


A B C D E F G H I J K L M N O P
1 2 3 4 5 6 7 8 9 10
CONTROL SW BOARD (CONDUCTOR SIDE)
KICK BOARD
PM1 HEAD
SYSTEM CONTROL BOARD (CONDUCTOR SIDE)
PL1 (FWD)
PL2 (REV)
M1 MOTOR
PM2 FF/REVERSE/AMS
IC401
IC402
IC302
LEVEL METER
INTERRUPT BOARD (CONDUCTOR SIDE)
TAPE SW BOARD (CONDUCTOR SIDE)
S109 CASSETTE LOADING ON ↓ OFF (WHILE EJECT BUTTON IS PRESSED: OFF)
S110 ERASE PROOF TAB ↑ NO TAB
S111 TAPE SELECT TYPE I/III ↑ TYPE II/IV
S112 TAPE SELECT TYPE I/II/III ↑ TYPE IV
ERASE HEAD BOARD (CONDUCTOR SIDE)
HE
HRP
PLAYBACK INPUT
HEAD TRANSLATION BOARD (CONDUCTOR SIDE)
TAPE INDICATION BOARD (CONDUCTOR SIDE)
D310 TYPE I (NORMAL)
D309 TYPE II (CrO2)
D308 TYPE III (Fe-Cr)
D307 TYPE IV (METAL)
IC301 BA328
AUDIO AMP BOARD (CONDUCTOR SIDE)
S203 ISS 1 → 2 → 3
S202 TAPE SELECTOR AUTO → III Fe-Cr (IV METAL)
AGC & AMS BOARD (CONDUCTOR SIDE)
IC301
IC303
0V OR 4.2V ACCORDING TO THE POSITION OF TAKE-UP REEL TABLE
4.5V WHILE EJECT BUTTON IS PRESSED: 0V
302	IC
405 404 410 409 408 407 406	D
Q, IC	D
406 405 408 IC401 404 403 411 IC402 412 401 410 413	402 414 412 411 416
Q IC	306 305 304 307 322 303 IC303
D	301 203,202,201 103,102,101

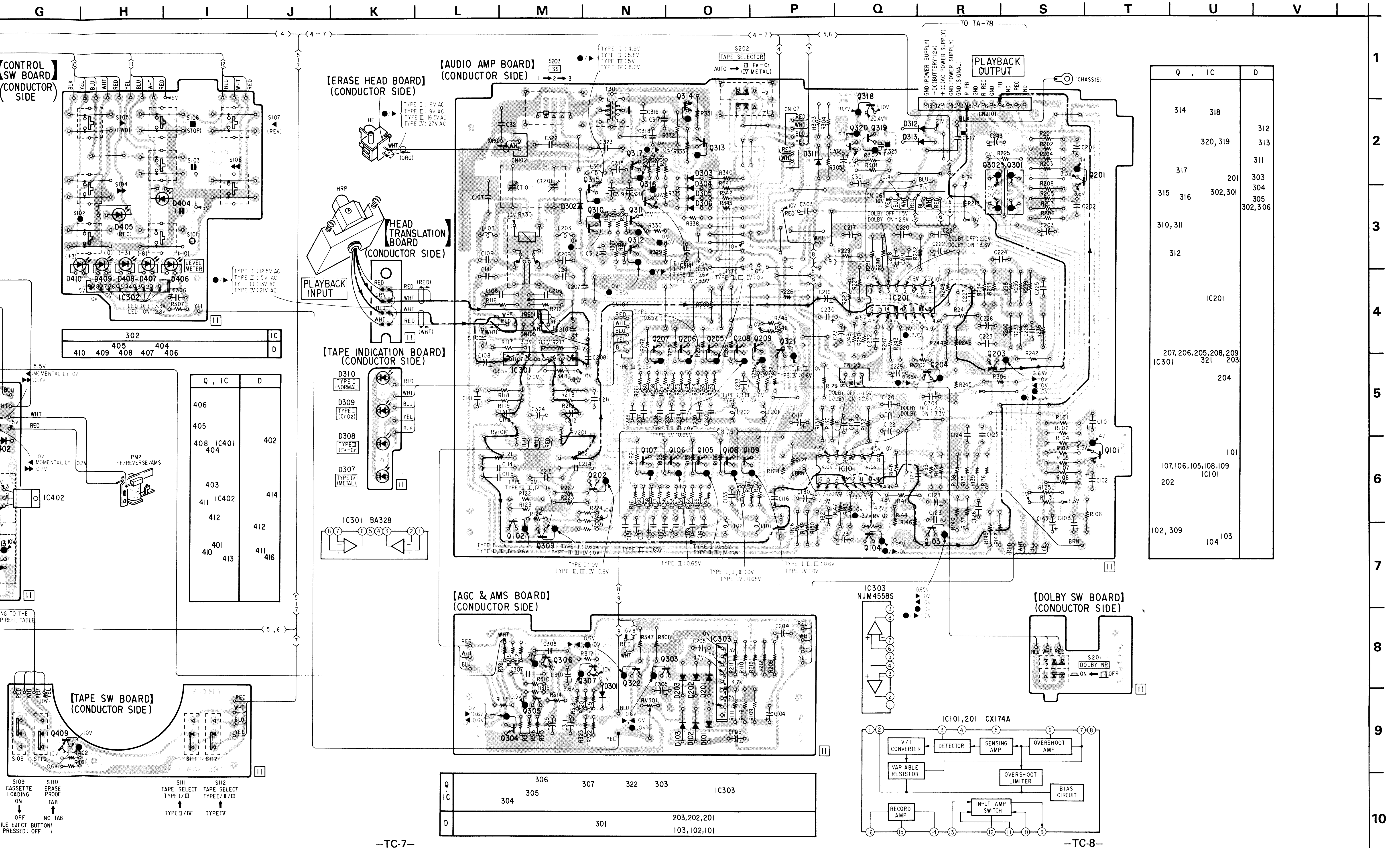
Note:

- Color code of sleeving over the end of the jacket.
- ○— : parts extracted from the component side.
- ●— : parts extracted from the conductor side.
- ■ : part mounted on the conductor side.
- ▨ : B + pattern
- ━━▶━ : signal path
- ━━━▶ : L-CH signal path
- ━·━·▶ : R-CH signal path

Applicable Serial No.:
AEP Model: 503,301 and later E1 Model: 322,901 and later
UK Model: 609,501 and later E2 Model: 405,401 and later

FH-7 **FH-7**
TC-78 **TC-78**

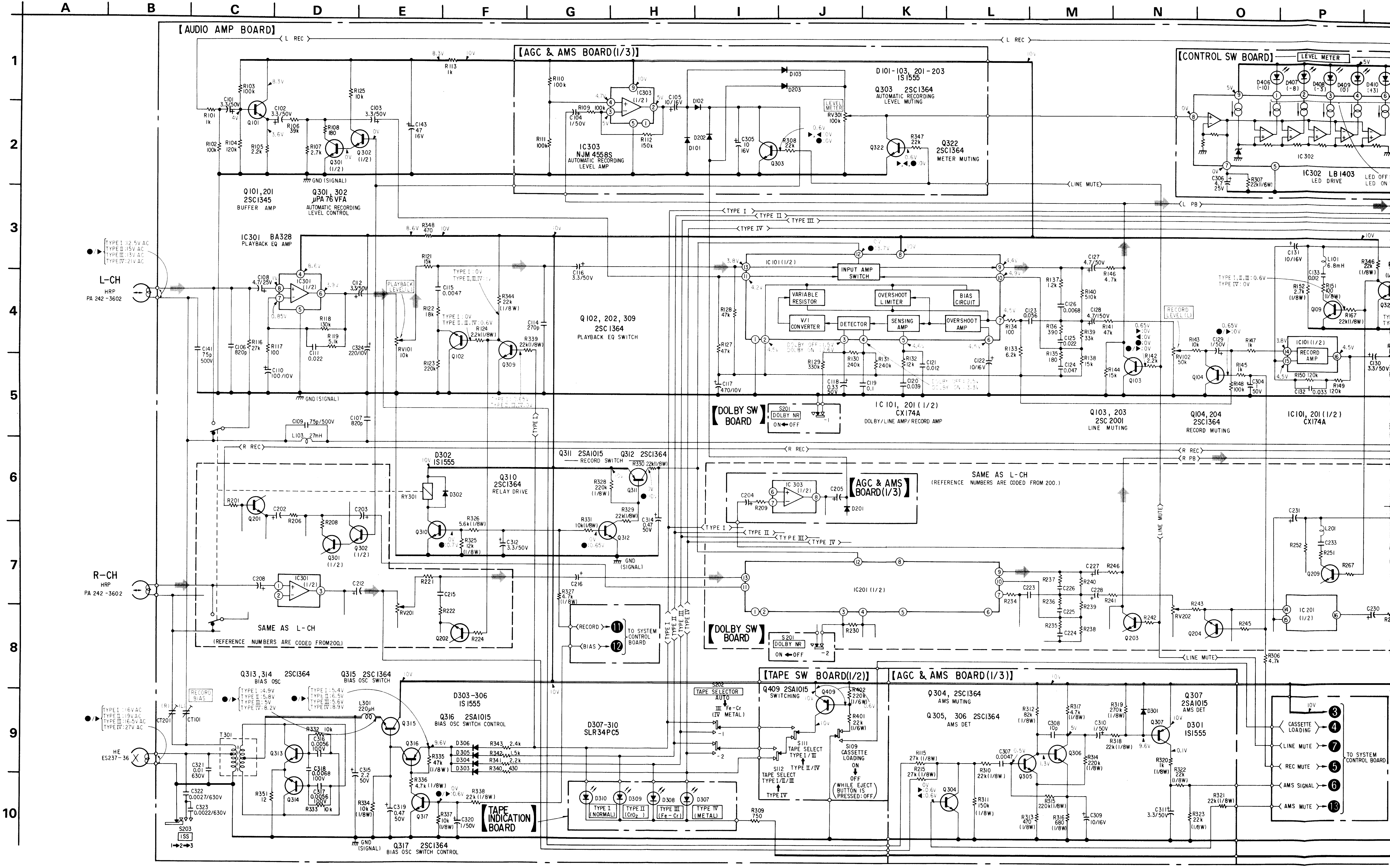
Applicable Serial No.:
AEP Model: 503,301 and later E1 Model: 322,901 and later
UK Model: 609,501 and later E2 Model: 405,401 and later



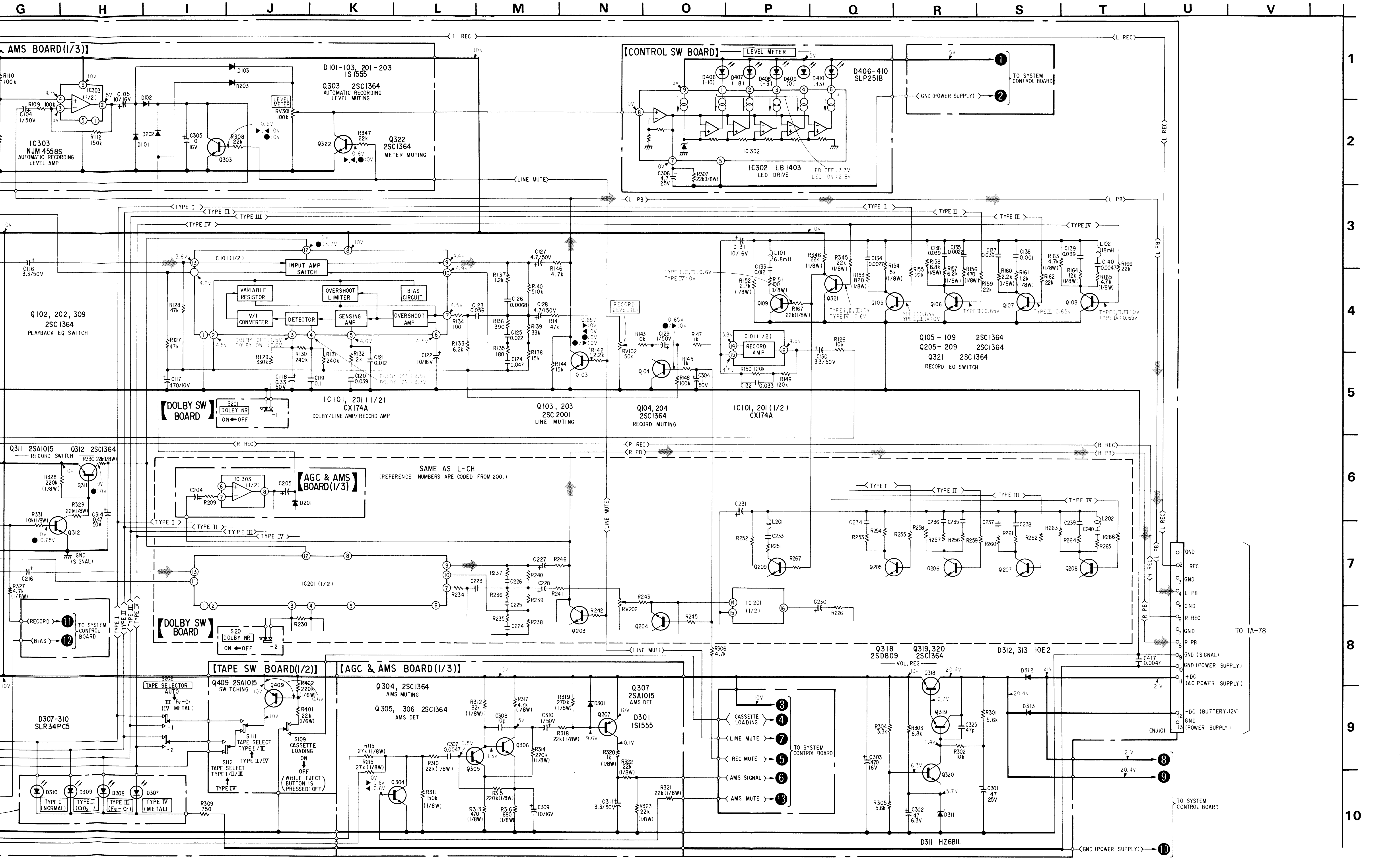
G H I J K L M N O P Q R S T U V
1 2 3 4 5 6 7 8 9 10
[CONTROL SW BOARD] (CONDUCTOR SIDE)
S105 (FWD)
S106 (STOP)
S107 (REV)
S103
S108
S104
D404
S102
D405 (REC)
S101
LEVEL METER
D410 D409 D408 D407 D406
IC302
LED OFF: 3.3V
LED ON: 2.8V
302
410 409 408 407 406
405 404
IC
D
[ERASE HEAD BOARD] (CONDUCTOR SIDE)
HE
TYPE I: 16V AC
TYPE II: 19V AC
TYPE III: 16.5V AC
TYPE IV: 27V AC
HRP
[HEAD TRANSLATION BOARD] (CONDUCTOR SIDE)
PLAYBACK INPUT
TYPE I: 12.5V AC
TYPE II: 15V AC
TYPE III: 13V AC
TYPE IV: 21V AC
[TAPE INDICATION BOARD] (CONDUCTOR SIDE)
D310 TYPE I (NORMAL)
D309 TYPE II (CrO2)
D308 TYPE III (Fe-Cr)
D307 TYPE IV (METAL)
IC301 BA328
[AUDIO AMP BOARD] (CONDUCTOR SIDE)
S203 ISS
TYPE I: 4.9V
TYPE II: 5.8V
TYPE III: 5V
TYPE IV: 8.2V
S202 TAPE SELECTOR
AUTO → III Fe-Cr (IV METAL)
TO TA-78
PLAYBACK OUTPUT
GND (POWER SUPPLY)
+DC (BUTTERY: 12V)
+DC (AC POWER SUPPLY)
GND (POWER SUPPLY)
GND (SIGNAL)
R PB
GND
R REC
GND
L PB
L REC
GND
(CHASSIS)
CNJ101
IC201
IC101
RY301
T301
CT101 CT201
DOLBY OFF: 1.5V
DOLBY ON: 2.6V
DOLBY OFF: 2.5V
DOLBY ON: 3.3V
Q , IC
D
314 318
312
320, 319
313
311
317
201
303
315 316
302, 301
304
305
302, 306
310, 311
312
IC201
207, 206, 205, 208, 209
IC301 321 203
204
101
107, 106, 105, 108, 109
IC101
202
102, 309
104 103
Q , IC
D
406
405
408 IC401
404
402
403
411 IC402
414
412
412
401
410 413
411
416
5.5V
MOMENTALILY 0V
0.7V
PM2
FF/REVERSE/AMS
IC402
NG TO THE
P REEL TABLE
[TAPE SW BOARD] (CONDUCTOR SIDE)
Q409
S109 CASSETTE LOADING
ON
OFF
ILE EJECT BUTTON PRESSED: OFF
S110 ERASE PROOF TAB
TAB
NO TAB
S111 TAPE SELECT TYPE I/III
TYPE II/IV
S112 TAPE SELECT TYPE I/II/III
TYPE IV
[AGC & AMS BOARD] (CONDUCTOR SIDE)
IC303
Q IC
306
305
304
307
322
303
IC303
D
301
203, 202, 201
103, 102, 101
IC303 NJM4558S
[DOLBY SW BOARD] (CONDUCTOR SIDE)
S201 DOLBY NR
ON
OFF
IC101, 201 CX174A
V/I CONVERTER
DETECTOR
SENSING AMP
OVERSHOOT AMP
VARIABLE RESISTOR
OVERSHOOT LIMITER
BIAS CIRCUIT
RECORD AMP
INPUT AMP SWITCH

SCHEMATIC DIAGRAM – AUDIO AMP SECTION –

- See page TC-14 for Notes.


A B C D E F G H I J K L M N O P
1 2 3 4 5 6 7 8 9 10
[AUDIO AMP BOARD]
[AGC & AMS BOARD(1/3)]
[CONTROL SW BOARD]
LEVEL METER
L REC
R REC
L PB
R PB
LINE MUTE
TYPE I
TYPE II
TYPE III
TYPE IV
Q101,201 2SC1345 BUFFER AMP
Q301, 302 μPA76VFA AUTOMATIC RECORDING LEVEL CONTROL
IC303 NJM 4558S AUTOMATIC RECORDING LEVEL AMP
D101-103, 201-203 1S1555
Q303 2SC1364 AUTOMATIC RECORDING LEVEL MUTING
Q322 2SC1364 METER MUTING
IC302 LB1403 LED DRIVE
LED OFF
LED ON
IC301 BA328 PLAYBACK EQ AMP
L-CH HRP PA 242-3602
R-CH HRP PA 242-3602
HE ES237-36
PLAYBACK LEVEL(L)
Q102, 202, 309 2SC1364 PLAYBACK EQ SWITCH
INPUT AMP SWITCH
VARIABLE RESISTOR
OVERSHOOT LIMITER
BIAS CIRCUIT
V/I CONVERTER
DETECTOR
SENSING AMP
OVERSHOOT AMP
IC101, 201 (1/2) CX174A DOLBY/LINE AMP/RECORD AMP
[DOLBY SW BOARD]
S201 DOLBY NR ON ← OFF
Q103, 203 2SC2001 LINE MUTING
Q104, 204 2SC1364 RECORD MUTING
RECORD LEVEL(L)
IC101 (1/2) RECORD AMP
IC101, 201 (1/2) CX174A
D302 1S1555
Q310 2SC1364 RELAY DRIVE
Q311 2SA1015 RECORD SWITCH
Q312 2SC1364
SAME AS L-CH (REFERENCE NUMBERS ARE CODED FROM 200.)
IC201 (1/2)
RECORD
BIAS
TO SYSTEM CONTROL BOARD
Q313, 314 2SC1364 BIAS OSC
Q315 2SC1364 BIAS OSC SWITCH
RECORD BIAS
D303-306 1S1555
Q316 2SA1015 BIAS OSC SWITCH CONTROL
Q317 2SC1364 BIAS OSC SWITCH CONTROL
D307-310 SLR34PC5
[TAPE INDICATION BOARD]
TYPE I (NORMAL)
TYPE II (CrO2 I)
TYPE III (Fe-Cr)
TYPE IV (METAL)
[TAPE SW BOARD(1/2)]
Q409 2SA1015 SWITCHING
S202 TAPE SELECTOR AUTO
III Fe-Cr
(IV METAL)
S111 TAPE SELECT TYPE I/III
S112 TAPE SELECT TYPE I/II/III
TYPE II/IV
S109 CASSETTE LOADING ON OFF (WHILE EJECT BUTTON IS PRESSED: OFF)
Q304, 2SC1364 AMS MUTING
Q305, 306 2SC1364 AMS DET
Q307 2SA1015 AMS DET
D301 1S1555
CASSETTE LOADING
LINE MUTE
REC MUTE
AMS SIGNAL
AMS MUTE
GND (SIGNAL)
S203 ISS 1→2→3

Note: Voltages are measured with a VOM (50kΩ/V).


G H I J K L M N O P Q R S T U V
1 2 3 4 5 6 7 8 9 10
AMS BOARD (1/3)
IC303 NJM4558S AUTOMATIC RECORDING LEVEL AMP
D101-103, 201-203 1S1555
Q303 2SC1364 AUTOMATIC RECORDING LEVEL MUTING
Q322 2SC1364 METER MUTING
LEVEL METER
RV301 100k
L REC
[CONTROL SW BOARD]
LEVEL METER
D406-410 SLP251B
IC302 LB1403 LED DRIVE
LED OFF: 3.3V
LED ON: 2.8V
TO SYSTEM CONTROL BOARD
GND (POWER SUPPLY)
LINE MUTE
L PB
TYPE I
TYPE II
TYPE III
TYPE IV
Q102, 202, 309 2SC1364 PLAYBACK EQ SWITCH
IC101 (1/2)
INPUT AMP SWITCH
VARIABLE RESISTOR
OVERSHOOT LIMITER
BIAS CIRCUIT
V/I CONVERTER
DETECTOR
SENSING AMP
OVERSHOOT AMP
DOLBY OFF: 1.5V
DOLBY ON: 2.6V
IC101, 201 (1/2) CX174A DOLBY/LINE AMP/RECORD AMP
[DOLBY SW BOARD]
S201 DOLBY NR ON←OFF
Q103, 203 2SC2001 LINE MUTING
Q104, 204 2SC1364 RECORD MUTING
RECORD LEVEL (L)
RV102 50k
RECORD AMP
IC101, 201 (1/2) CX174A
TYPE I, II, III: 0.6V
TYPE IV: 0V
Q105-109 2SC1364
Q205-209 2SC1364
Q321 2SC1364
RECORD EQ SWITCH
Q311 2SA1015 Q312 2SC1364 RECORD SWITCH
GND (SIGNAL)
R REC
R PB
SAME AS L-CH
(REFERENCE NUMBERS ARE CODED FROM 200.)
IC303 (1/2)
[AGC & AMS BOARD (1/3)]
IC201 (1/2)
RV202
TO SYSTEM CONTROL BOARD
RECORD
BIAS
[TAPE SW BOARD (1/2)]
Q409 2SA1015 SWITCHING
S202 TAPE SELECTOR AUTO
III Fe-Cr (IV METAL)
S111 TAPE SELECT TYPE I/III
S112 TAPE SELECT TYPE I/II/III
TYPE II/IV
S109 CASSETTE LOADING ON OFF (WHILE EJECT BUTTON IS PRESSED: OFF)
D307-310 SLR34PC5
D310 TYPE I (NORMAL)
D309 TYPE II (CrO2)
D308 TYPE III (Fe-Cr)
D307 TYPE IV (METAL)
[AGC & AMS BOARD (1/3)]
Q304, 2SC1364 AMS MUTING
Q305, 306 2SC1364 AMS DET
Q307 2SA1015 AMS DET
D301 1S1555
CASSETTE LOADING
LINE MUTE
REC MUTE
AMS SIGNAL
AMS MUTE
Q318 2SD809
Q319, 320 2SC1364
VOL. REG
D312, 313 10E2
D311 HZ6BIL
CNJ101
GND
L REC
GND
L PB
GND
R REC
GND
R PB
GND (SIGNAL)
GND (POWER SUPPLY)
+DC (AC POWER SUPPLY)
+DC (BATTERY: 12V)
GND (POWER SUPPLY)
TO TA-78
TO SYSTEM CONTROL BOARD
GND (POWER SUPPLY)

FH-7

TC-78/78C

SERVICE MANUAL

TC-78C:
US Model
Canadian Model
TC-78:
AEP Model
UK Model
E Model

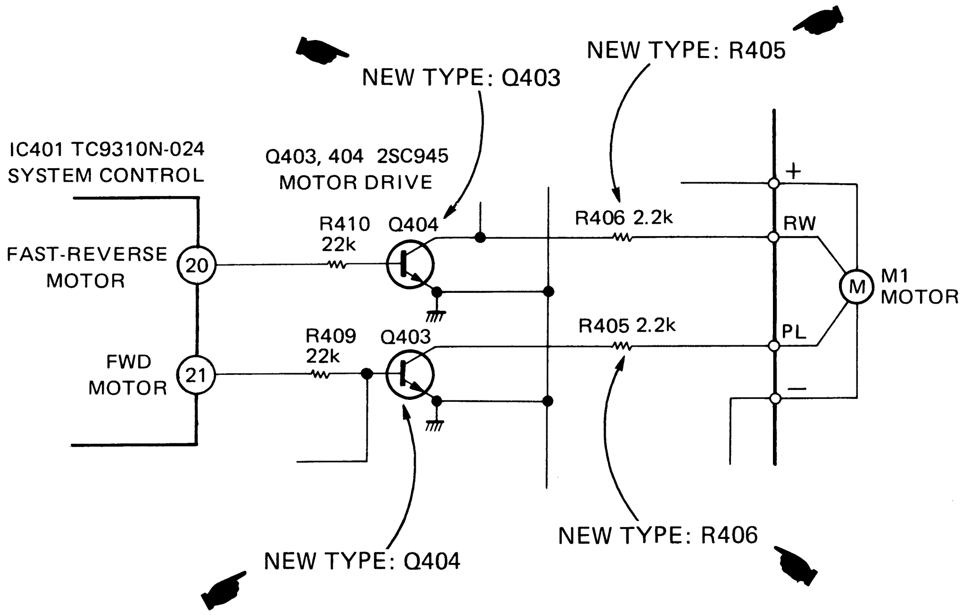
No. 4
December, 1983

SUPPLEMENT

File this supplement with the service manual.

Subject: System control board change

Because of system control board change, the new mounting diagram has been issued. As to the schematic diagram, refer to the service manual (Supplement No. 3) using TC9310N-024 for system control IC.
Besides, be careful of the difference of reference numbers (Q403, Q404, R405, R406) between the former type and the new type.


NEW TYPE: Q403
NEW TYPE: R405
IC401 TC9310N-024
SYSTEM CONTROL
Q403, 404 2SC945
MOTOR DRIVE
R410 22k
Q404
R406 2.2k
+
RW
FAST-REVERSE MOTOR
20
M
M1
MOTOR
R409 22k
Q403
R405 2.2k
PL
FWD MOTOR
21
−
NEW TYPE: R406
NEW TYPE: Q404

STEREO CASSETTE DECK

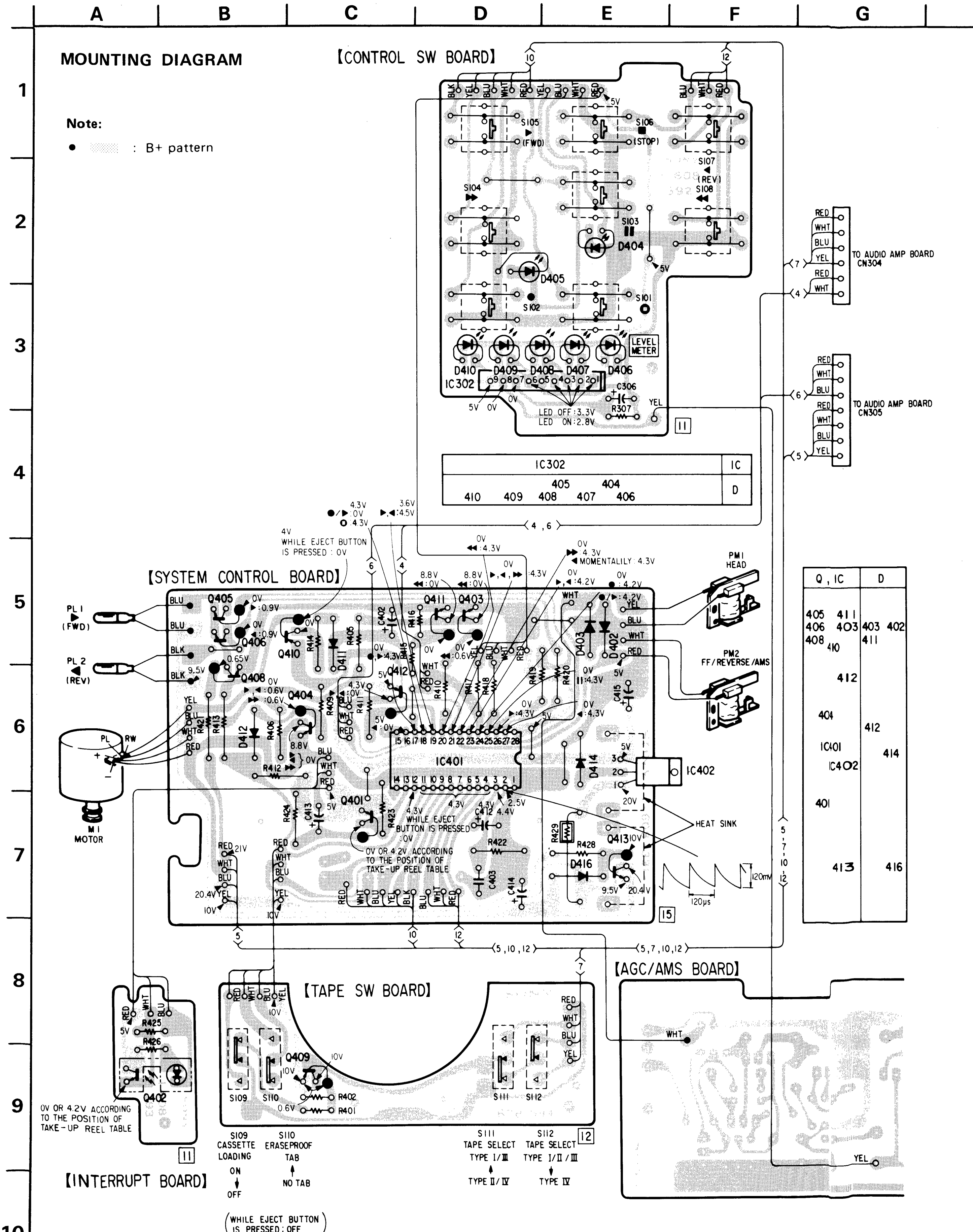
SONY®

AUD

MOUNTING DIAGRAM

Note:

- ● ▨ : B+ pattern


A
B
C
D
E
F
G
1
2
3
4
5
6
7
8
9
10
【CONTROL SW BOARD】
S105 ▶ (FWD)
S106 ■ (STOP)
S107 ◀ (REV)
S108 ◀◀
S104 ▶▶
S103 ❚❚
D404
D405
S102 ●
S101 ○
LEVEL METER
D410 D409 D408 D407 D406
IC302
C306
R307
LED OFF: 3.3V
LED ON: 2.8V
5V 0V
YEL
11
TO AUDIO AMP BOARD CN304
TO AUDIO AMP BOARD CN305
IC302 IC
405 404
410 409 408 407 406 D
【SYSTEM CONTROL BOARD】
4V WHILE EJECT BUTTON IS PRESSED : 0V
PL1 ▶ (FWD)
PL2 ◀ (REV)
M1 MOTOR
Q405
Q406
Q408
Q410
D411
Q404
D412
Q411
Q403
Q412
IC401
IC402
D403
D402
D414
Q401
Q413
D416
R429
R428
R422
C403
C414
C412
C413
C415
HEAT SINK
4.3V WHILE EJECT BUTTON IS PRESSED : 0V
0V OR 4.2V ACCORDING TO THE POSITION OF TAKE-UP REEL TABLE
PM1 HEAD
PM2 FF/REVERSE/AMS
120mV
120μs
15
(5,10,12)
(5,7,10,12)
(4,6)
Q, IC
D
405 411
406 403 403 402
408 410 411
412
404
412
IC401
IC402
414
401
413 416
【TAPE SW BOARD】
Q409
S109
S110
S111
S112
R402
R401
12
S109 CASSETTE LOADING ON ↓ OFF
(WHILE EJECT BUTTON IS PRESSED : OFF)
S110 ERASEPROOF TAB ↑ NO TAB
S111 TAPE SELECT TYPE I/III ↑ TYPE II/IV
S112 TAPE SELECT TYPE I/II/III ↓ TYPE IV
【AGC/AMS BOARD】
WHT
YEL
【INTERRUPT BOARD】
Q402
R425
R426
0V OR 4.2V ACCORDING TO THE POSITION OF TAKE-UP REEL TABLE
11

Sony Corporation

English
83L04137-1
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1/16 WATT CARBON RESISTOR

Ω	*Part No.*	Ω	*Part No.*	Ω	*Part No.*	Ω	*Part No.*	Ω	*Part No.*	Ω	*Part No.*	Ω	*Part No.*
2.0	—	13	—	91	1-210-354-00	620	1-210-367-00	4.3k	1-209-772-00	30k	1-210-380-00	200k	1-210-839-00
2.2	—	15	—	100	1-210-355-00	680	1-210-106-00	4.7k	1-209-773-00	33k	1-210-381-00	220k	1-210-840-00
2.4	—	16	—	110	1-210-356-00	750	1-210-107-00	5.1k	1-209-774-00	36k	1-210-394-00	240k	—
2.7	—	18	1-211-688-00	120	1-210-357-00	820	1-210-108-00	5.6k	1-209-775-00	39k	1-210-382-00	270k	1-210-841-00
3.0	—	20	—	130	1-210-358-00	910	1-210-368-00	6.2k	1-209-776-00	43k	1-210-383-00	300k	—
3.3	—	22	—	150	1-210-102-00	1.0k	1-204-122-00	6.8k	1-209-777-00	47k	1-210-384-00	330k	1-210-842-00
3.6	—	24	—	160	1-210-359-00	1.1k	1-210-369-00	7.5k	1-209-778-00	51k	1-210-385-00	360k	—
3.9	—	27	—	180	1-210-360-00	1.2k	1-209-765-00	8.2k	1-209-779-00	56k	1-210-386-00	390k	1-210-843-00
4.3	—	30	1-210-845-00	200	1-210-361-00	1.3k	1-210-370-00	9.1k	1-209-780-00	62k	1-210-387-00	430k	—
4.7	—	33	1-210-846-00	220	1-210-362-00	1.5k	1-209-766-00	10k	1-209-781-00	68k	1-210-388-00	470k	1-210-844-00
5.1	—	36	1-210-847-00	240	1-209-762-00	1.6k	1-210-371-00	11k	1-210-374-00	75k	1-210-389-00	510k	—
5.6	—	39	1-210-848-00	270	1-210-363-00	1.8k	1-209-878-00	12k	1-210-111-00	82k	1-210-390-00	560k	1-211-695-00
6.2	—	43	1-210-849-00	300	1-210-364-00	2.0k	1-209-767-00	13k	1-210-375-00	91k	1-210-391-00	620k	—
6.8	—	47	1-210-395-00	330	1-209-763-00	2.2k	1-209-768-00	15k	1-210-112-00	100k	1-210-115-00	680k	1-211-696-00
7.5	—	51	1-210-101-00	360	1-210-103-00	2.4k	1-209-769-00	16k	1-210-376-00	110k	—	750k	—
8.2	—	56	1-210-351-00	390	1-210-365-00	2.7k	1-209-770-00	18k	1-210-113-00	120k	1-210-836-00	820k	1-211-698-00
9.1	—	62	1-210-352-00	430	1-210-366-00	3.0k	1-210-372-00	20k	1-210-377-00	130k	—	910k	—
10	—	68	1-210-353-00	470	1-209-764-00	3.3k	1-204-123-00	22k	1-210-114-00	150k	1-210-837-00	1 M	—
11	—	75	1-210-392-00	510	1-210-104-00	3.6k	1-210-373-00	24k	1-210-378-00	160k	—		
12	—	82	1-210-393-00	560	1-210-105-00	3.9k	1-209-771-00	27k	1-210-379-00	180k	1-210-838-00		

1/8 WATT CARBON RESISTOR

Ω	*Part No.*	Ω	*Part No.*	Ω	*Part No.*	Ω	*Part No.*	Ω	*Part No.*	Ω	*Part No.*	Ω	*Part No.*
2.0	—	13	1-246-821-00	91	1-246-831-00	620	1-246-841-00	4.3k	1-246-851-00	30k	1-246-861-00	200k	1-246-871-00
2.2	1-246-751-00	15	1-246-761-00	100	1-246-771-00	680	1-246-781-00	4.7k	1-246-791-00	33k	1-246-801-00	220k	1-246-811-00
2.4	—	16	1-246-822-00	110	1-246-832-00	750	1-246-842-00	5.1k	1-246-852-00	36k	1-246-862-00	240k	1-247-054-00
2.7	1-246-752-00	18	1-246-762-00	120	1-246-772-00	820	1-246-782-00	5.6k	1-246-792-00	39k	1-246-802-00	270k	1-247-046-00
3.0	—	20	1-246-823-00	130	1-246-833-33	910	1-246-843-00	6.2k	1-246-853-00	43k	1-246-863-00	300k	1-247-055-00
3.3	1-246-753-00	22	1-246-763-00	150	1-246-773-00	1.0k	1-246-783-00	6.8k	1-246-793-00	47k	1-246-803-00	330k	1-247-047-00
3.6	—	24	1-246-824-00	160	1-246-834-00	1.1k	1-246-844-00	7.5k	1-246-854-00	51k	1-246-864-00	360k	1-247-056-00
3.9	1-246-754-00	27	1-246-764-00	180	1-246-774-00	1.2k	1-246-784-00	8.2k	1-246-794-00	56k	1-246-804-00	390k	1-247-048-00
4.3	—	30	1-246-825-00	200	1-246-835-00	1.3k	1-246-845-00	9.1k	1-246-855-00	62k	1-246-865-00	430k	1-247-057-00
4.7	1-246-755-00	33	1-246-765-00	220	1-246-775-00	1.5k	1-246-785-00	10k	1-246-795-00	68k	1-246-805-00	470k	1-247-049-00
5.1	—	36	1-246-826-00	240	1-246-836-00	1.6k	1-246-846-00	11k	1-246-856-00	75k	1-246-866-00	510k	1-247-058-00
5.6	1-246-756-00	39	1-246-766-00	270	1-246-776-00	1.8k	1-246-786-00	12k	1-246-796-00	82k	1-246-806-00	560k	1-247-050-00
6.2	—	43	1-246-827-00	300	1-246-837-00	2.0k	1-246-847-00	13k	1-246-857-00	91k	1-246-867-00	620k	1-247-059-00
6.8	1-246-757-00	47	1-246-767-00	330	1-246-777-00	2.2k	1-246-787-00	15k	1-246-797-00	100k	1-246-807-00	680k	1-247-051-00
7.5	1-246-818-00	51	1-246-828-00	360	1-246-838-00	2.4k	1-246-848-00	16k	1-246-858-00	110k	1-246-868-00	750k	1-247-060-00
8.2	1-246-758-00	56	1-246-768-00	390	1-246-778-00	2.7k	1-246-788-00	18k	1-246-798-00	120k	1-246-808-00	820k	1-247-052-00
9.1	1-246-819-00	62	1-246-829-00	430	1-246-839-00	3.0k	1-246-849-00	20k	1-246-859-00	130k	1-246-869-00	910k	1-247-061-00
10	1-246-759-00	68	1-246-769-00	470	1-246-779-00	3.3k	1-246-789-00	22k	1-246-799-00	150k	1-246-809-00	1 M	1-247-053-00
11	1-246-820-00	75	1-246-830-00	510	1-246-840-00	3.6k	1-246-850-00	24k	1-246-860-00	160k	1-246-870-00		
12	1-246-760-00	82	1-246-770-00	560	1-246-780-00	3.9k	1-246-790-00	27k	1-246-800-00	180k	1-246-810-00		

1/4 WATT CARBON RESISTORS

Ω	Part No.	Ω	Part No.	Ω	Part No.	Ω	Part No.	Ω	Part No.	Ω	Part No.	Ω	Part No.
1.0	1-246-401-00	10	1-246-425-00	100	1-246-449-00	1.0k	1-246-473-00	10k	1-246-497-00	100k	1-246-521-00	1.0M	1-246-545-00
1.1	1-246-402-00	11	1-246-426-00	110	1-246-450-00	1.1k	1-246-474-00	11k	1-246-498-00	110k	1-246-522-00	1.1M	1-210-814-00
1.2	1-246-403-00	12	1-246-427-00	120	1-246-451-00	1.2k	1-246-475-00	12k	1-246-499-00	120k	1-246-523-00	1.2M	1-210-815-00
1.3	1-246-404-00	13	1-246-428-00	130	1-246-452-00	1.3k	1-246-476-00	13k	1-246-500-00	130k	1-246-524-00	1.3M	1-210-816-00
1.5	1-246-405-00	15	1-246-429-00	150	1-246-453-00	1.5k	1-246-477-00	15k	1-246-501-00	150k	1-246-525-00	1.5M	1-210-817-00
1.6	1-246-406-00	16	1-246-430-00	160	1-246-454-00	1.6k	1-246-478-00	16k	1-246-502-00	160k	1-246-526-00	1.6M	1-210-818-00
1.8	1-246-407-00	18	1-246-431-00	180	1-246-455-00	1.8k	1-246-479-00	18k	1-246-503-00	180k	1-246-527-00	1.8M	1-210-819-00
2.0	1-246-408-00	20	1-246-432-00	200	1-246-456-00	2.0k	1-246-480-00	20k	1-246-504-00	200k	1-246-528-00	2.0M	1-210-820-00
2.2	1-246-409-00	22	1-246-433-00	220	1-246-457-00	2.2k	1-246-481-00	22k	1-246-505-00	220k	1-246-529-00	2.2M	1-210-821-00
2.4	1-246-410-00	24	1-246-434-00	240	1-246-458-00	2.4k	1-246-482-00	24k	1-246-506-00	240k	1-246-530-00	2.4M	1-244-754-00
2.7	1-246-411-00	27	1-246-435-00	270	1-246-459-00	2.7k	1-246-483-00	27k	1-246-507-00	270k	1-246-531-00	2.7M	1-244-755-00
3.0	1-246-412-00	30	1-246-436-00	300	1-246-460-00	3.0k	1-246-484-00	30k	1-246-508-00	300k	1-246-532-00	3.0M	1-244-756-00
3.3	1-246-413-00	33	1-246-437-00	330	1-246-461-00	3.3k	1-246-485-00	33k	1-246-509-00	330k	1-246-533-00	3.3M	1-244-757-00
3.6	1-246-414-00	36	1-246-438-00	360	1-246-462-00	3.6k	1-246-486-00	36k	1-246-510-00	360k	1-246-534-00	3.6M	1-244-758-00
3.9	1-246-415-00	39	1-246-439-00	390	1-246-463-00	3.9k	1-246-487-00	39k	1-246-511-00	390k	1-246-535-00	3.9M	1-244-759-00
4.3	1-246-416-00	43	1-246-440-00	430	1-246-464-00	4.3k	1-246-488-00	43k	1-246-512-00	430k	1-246-536-00	4.3M	1-244-760-00
4.7	1-246-417-00	47	1-246-441-00	470	1-246-465-00	4.7k	1-246-489-00	47k	1-246-513-00	470k	1-246-537-00	4.7M	1-244-761-00
5.1	1-246-418-00	51	1-246-442-00	510	1-246-466-00	5.1k	1-246-490-00	51k	1-246-514-00	510k	1-246-538-00	5.1M	1-244-762-00
5.6	1-246-419-00	56	1-246-443-00	560	1-246-467-00	5.6k	1-246-491-00	56k	1-246-515-00	560k	1-246-539-00		
6.2	1-246-420-00	62	1-246-444-00	620	1-246-468-00	6.2k	1-246-492-00	62k	1-246-516-00	620k	1-246-540-00		
6.8	1-246-421-00	68	1-246-445-00	680	1-246-469-00	6.8k	1-246-493-00	68k	1-246-517-00	680k	1-246-541-00		
7.5	1-246-422-00	75	1-246-446-00	750	1-246-470-00	7.5k	1-246-494-00	75k	1-246-518-00	750k	1-246-542-00		
8.2	1-246-423-00	82	1-246-447-00	820	1-246-471-00	8.2k	1-246-495-00	82k	1-246-519-00	820k	1-246-543-00		
9.1	1-246-424-00	91	1-246-448-00	910	1-246-472-00	9.1k	1-246-496-00	91k	1-246-520-00	910k	1-246-544-00		

HARDWARE NOMENCLATURE

Screw: – P 3 x 10

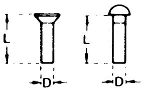
L: Length in mm

D: Diameter in mm

Type of head

Indicated slotted-head only.

Unless otherwise indicated, it means cross-recessed head (Phillips type).



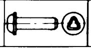
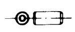
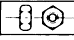
Nut, Washer, Retaining ring:

N 3

Diameter of usable screw or shaft

Reference designation

Reference Designation	Shape	Description	Remarks
		SCREWS	
P		pan-head screw	binding-head (B) screw for replacement
PWH		pan-head screw with washer face	binding-head (B) screw and flat washer for replacement
PS PSP		pan-head screw with spring washer	binding-head (B) screw and spring washer for replacement
PSW PSPW		pan-head screw with spring and flat washers	binding-head (B) screw and spring and flat washers for replacement
R		round-head screw	binding-head (B) screw for replacement
K		flat-countersunk-head screw	
RK		oval-countersunk-head screw	
B		binding-head screw	
T		truss-head screw	binding-head (B) screw for replacement
F		flat-fillister-head screw	
RF		fillister-head screw	
BV		brazier-head screw	

Reference Designation	Shape	Description	Remarks
		SELF-TAPPING SCREWS	
TA		self-tapping screw	ex: TA, P 3 x 10
PTP		pan-head self-tapping screw	binding-head self-tapping (TA, B) screw for replacement
PTPWH		pan-head self-tapping screw with washer face	binding-head self tapping (TA, B) screw and flat washer for replacement
PTTWH		pan-head thread-rolling screw with washer face	binding-head (B) screw and flat washer for replacement
		SET SCREWS	
SC		set screw	
SC		hexagon-socket set screw	ex: SC 2.6 x 4, hexagon socket
		NUT	
N		nut	
		WASHERS	
W		flat washer	
SW		spring washer	
LW		internal-tooth lock washer	ex: LW3, internal
LW		external-tooth lock washer	ex: LW3, external
		RETAINING RINGS	
E		retaining ring	
G		grip-type retaining ring	

Sony Corporation
Audio Group

9-950-987-11
(with 9-950-987-81, 9-950-987-83, 9-950-987-87, 9-950-987-8A)

English
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